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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Chemical Plant Progress

THE notes published in this issue as to the types of chemical plant now produced in this country give some idea of the very wide field covered. When the war closed, it used to be commonly remarked that chemical engineering as understood, for example, in Germany was hardly known in this country. The complaint was no doubt exaggerated even then, for we have had for years established British firms who have installed plant in all parts of the Empire, and whose consultative and advisory service is second to none. But the science of chemical engineering has in recent years been taken up with greatly increased interest, and any advance in the science is inevitably accompanied by improvements in design and construction. For the vast number of technical operations now carried on, the user has a very wide selection from British makers, without including French and German firms. The apparatus has reached a degree of variety and fineness equal to the most delicate operations, and enormous advantages have followed the use of non-corrosive metals and alloys and the development of enamelled chemical ware. The improved design of plant, the increased wearing qualities, the neutralisation of corrosive agencies, the obtaining of the fullest possible results from each operation with the minimum of cost and wear, bring ultimately to the consumer the advantage of better and cheaper products and thus tend to the development of industry in general.

Without making any unfriendly comparison with the best products of France and Germany, it may fearlessly be claimed that the characteristic feature of British plant is that it works. It used to be a common criticism, and occasionally it is still heard, that British firms were a little inelastic in their methods, and less ready than others to adapt their standards to individual orders. We have known occasions, however, where such suggestions proved on investigation to be entirely without foundation; the evidence showed that British firms were as ready to go into good propositions as any others, but had no time to waste on frivolous investigations. In any case, whether the foreigner had some advantage in his methods of "approach" or not, the customer always knew that when a British plant maker put down an installation, he was putting something down that would work and wear. After all, those are the tests. A machine that works well, without requiring to be periodically tinkered with, and wears well right to the end, is the really economical machine. Here is one example brought to our notice recently. In the case of a heating installation which did not produce the results expected, it was decided to take out a motor of foreign make and to substitute one of British make. That simple substitution changed failure into success. The trouble entirely ceased. We have, of course, no wish to suggest that this is what always happens; but the British reputation for quality is a great national asset, and it stands as high in the chemical plant field as in any other. In point of design, construction, and constructional materials, the position was never so strong as it is to-day, and the study that is now being given to all such matters is the best guarantee of its maintenance and still further improvement. Only the very best of foreign products now stands a chance in the presence of the searching tests to which chemical operations expose the apparatus employed, and only foreign firms of the highest repute think it worth while to compete in the British market.

The Study of Explosion Risks

A SERIES of investigations is now being conducted by the U.S.A. Bureau of Mines into the causes of various types of explosion, and presently some important conclusions may be recorded. The cause of the great explosion at Oppau, for example, has never been explained, and in co-operation with the National Research Council an investigation is being conducted to determine the fundamental conditions under which accidental explosion of ammonium compounds, during manufacture or when stored in large quantities, might arise. Investigations to date show that ammonium

nitrate is not combustible, but supports combustion of oxidisable materials. Detonation is not readily initiated by fire or heat, but can be initiated by a detonator and by various other explosives, and is aided by increased confinement. Ammonium nitrate is more sensitive to detonation, and the rate of detonation increases at higher temperatures. A study of disastrous explosions has led to the belief that impurities or combustible materials have had an important part in causing them. Future investigations will be directed to the effect of impurities, especially easily combustible materials.

In the course of a general study of liquid oxygen explosives, the Bureau is investigating the effect of the physical and chemical properties of combustible absorbent materials and wrappers on the absorption and retention of oxygen, the explosive properties and formation of carbon monoxide, and is applying the results of this fundamental knowledge to blasting under mining conditions. Tests of a number of brands of fuse have resulted in a better understanding of the effect of low temperature on the burning rate of fuse and of the requirements of a fuse for use with liquid oxygen explosives. The relation between oxygen content of the cartridge and explosive strength has been investigated and the effect of purity of oxygen on explosive properties of liquid oxygen explosive cartridges has been determined. The Bureau is also determining the physical properties as, for example, rate of detonation, disruptive force, etc., of liquid oxygen explosives prepared by the section on laboratory research, and is determining the most efficient types of liquid oxygen explosives for field uses. Practical application of fundamental data obtained at Pittsburgh has been made in actual blasting at several mines. It was shown to be possible to blast with liquid oxygen explosives without formation of harmful quantities of carbon monoxide, providing cartridges of correct density were used and the round fired within eight minutes.

A third study that has been undertaken is one into the conditions that tend to cause explosions of compressed oxygen in contact with oil, especially the influence of temperature and pressure. In one case oxygen was suddenly or gradually admitted into small steel bombs containing some oil spread out on asbestos or paper. The first series of experiments was conducted at room temperature. Various pressures up to 2,500 lb. per sq. in. were tried. In no case did any explosion result. Temperatures were then increased to 120° C. (250° F.) when the first explosion occurred, linseed oil being used. Similar explosions took place with kerosene at 175° C. (350° F.), automobile motor oil at 170° C. (340° F.), and sperm oil at 135° C. (280° F.). Variations of pressure from 1,000 to 4,000 lb. did not make any material difference in the ignition temperatures. Another source of danger is in the accidental mixture of a combustible gas with compressed oxygen. In making oxygen by the electrolytic process, oxygen is given off at one pole of the electrolyte cell and hydrogen at the other. If the polarity of the generator becomes reversed, hydrogen goes into the oxygen collecting chamber and a very explosive mixture may result. Such accidents have occurred with disastrous results. In general, the precautions to be observed with compressed oxygen may be summarised briefly as follows: Compressed oxygen should never be put into cylinders, bottles, or pipes that have previously been used for other gases. Oxygen cylinders should never be used for any other gases than oxygen. Oil should not be used for lubrication of oxygen compressors, but water only. As regards compressors in liquid air plants or for furnishing compressed air for industrial purposes ordinary machine oil should not be used; specially prepared compressor oils in which the flash-point is not less than 200° C. (395° F.) have been recommended for this purpose. In air compressors, neither gasoline nor kerosene should be used for cleaning valves, as the vapours may enter the compressor. The oxygen equipment should always be kept cool.

New Methods for Recovering Molybdite

Two new leaching methods for the recovery of molybdite from the ore have recently been tested in America, and are believed to have commercial possibilities. The dielectric separation process has also been investigated, but is regarded as having only limited possibilities. A rapidly increasing amount of molybdenum is being used in the manufacture of alloy steels, to which, in conjunction with other metals, molybdenum imparts many desirable properties. Much smaller amounts of molybdenum are used in metallic form for electrical equipment, in non-ferrous alloys, and in chemical reagents, dyes, and various other chemical products. Until recently molybdenum was added to steel in the form of ferro-molybdenum. At present, however, most of the molybdenum used in steel is added in the form of calcium molybdate; reduction and combination as alloy result from the contact of the molybdate with the molten steel. This change marks an important economy in the production of molybdenum alloys. Ferro-molybdenum usually contains 50 to 60 per cent. molybdenum; 2 per cent. carbon is the maximum for one grade and 0·5 for another. Calcium molybdate is sold containing about 42 per cent. molybdenum. The presence of appreciable amounts of phosphorus, sulphur, or any easily reducible metal is not usually tolerated in either ferro-molybdenum or calcium molybdate. Molybdite, a hydrated ferric molybdate, generally occurs in molybdenite ores as an oxidation product. By flotation, the present method of concentration, a high recovery of the molybdenite is usually obtained, but the molybdite or oxidised portion of the ore is lost in the tailing. Virtually all the known deposits of molybdenite contain considerable molybdite, the recovery of which presents an important problem in the prevention of an economic waste.

In one of the leaching methods tested by the U.S.A. Bureau of Mines metallurgists, the procedure is to extract the ore with hot soda solution, acidify with sulphuric acid, add a small amount of sodium acetate, and digest with lead sulphate. Molybdenum is completely precipitated as lead molybdate, which can be converted to molybdenum trioxide. In the other process the ore is extracted with warm dilute sulphuric acid and the free acid completely neutralised with scrap iron. Molybdenum is completely precipitated

as a hydrate of molybdenum dioxide nearly pure. By treating the hot roasted ore with chlorine practically complete separation of the molybdenum from all other ore constituents is obtained in one operation. The distillate is quite pure and is easily converted to molybdenum trioxide or calcium molybdate. The consumption of chlorine need not be heavy and the regeneration of chlorine for repeated use seems possible. Details of this investigation are given in the U.S.A. Bureau of Mines Technical Paper 399, *Recovery of Molybdite from the Ore*, which may be obtained from the Superintendent of Documents, Washington, D.C., for 5 cents.

A Chemical Warfare Manual

THE *Manual of the Medical Aspects of Chemical Warfare* (H.M. Stationery Office, 9d.), which has been issued by the Army Council, indicates that, however much popular sentiment may be opposed to chemical warfare, the military authorities assume its inevitable employment in any future war. This document is intended for the use of medical officers, and it embodies in a portable form particulars likely to be of practical value in the field. "Chemical warfare," it is frankly stated, "is a rapidly developing science, and it is certain that an enemy will endeavour to circumvent our protective measures by using known substances more effectively and in higher concentrations over more extended areas and by the introduction of new poisonous gases. It is of paramount importance that immediate report should be made to the superior medical authorities on the appearance of cases showing symptoms in any way different from those described in this manual, in order that steps may be taken without delay to afford adequate protection, and that medical officers in areas which have not experienced the new poison may have timely warning of the possibility of its use and all information which may help in the prevention of casualties and in the treatment of those affected."

In addition to the more purely medical aspects of chemical warfare, medical officers are urged to study the manuals on general defence against chemical weapons and to take advantage of every opportunity of familiarising themselves with the use of defensive appliances. They are advised also to accustom themselves to the use of respirators so as to be able to carry out their duties whilst wearing them without loss of efficiency. To the layman who knows nothing of what is going on, it will probably come as a shock to find the preparation for the use of toxic gases, etc., so far advanced.

Higher Railway Rates

IT is a curious example of the watertight compartment methods on which so much of our business is conducted that at the very moment when every facility should be given for assisting the recovery of trade the railway companies should announce their decision to increase the rates, tolls, and charges for merchandise train traffic on and from February 1. This policy could hardly fail to incense traders, who are already labouring under sufficiently heavy handicaps without having this fresh burden imposed on them. The executive committee of the Mansion House Association on Railway and Canal Traffic has already taken the matter up, and this example needs to be vigorously followed by every organisation of the kind. The case to be placed before the Railway Clearing House sets out some important considerations against the proposed increase. One point is that the immediate imposition of increased rates will seriously complicate the readjustment of prices for long-period contracts. Another is that, at the present juncture, the increase is bound to retard trade recovery, just when some real prospect is beginning to appear of a revival after the prolonged labour troubles of the past year. From the railway companies' point of view, the effect will be to divert still more traffic from rail to road. Whether this consideration will be appreciated is doubtful, for the development of commercial road traffic is one of the direct consequences of the railway companies' inelastic policy towards traders in the past. The view that the Mansion House Association is pressing on the Railway Clearing House is that the increases are premature, and should be deferred for more careful consideration with the traders, as a period of delay would enable the companies to ascertain whether or not the recovery of trade, which is generally anticipated, would provide them with the whole or part of the additional revenue they require. It is to be hoped that these representations will be vigorously supported by all trading organisations.

The Calendar

Feb.		
1	Institute of Metals (Birmingham Section): Paper on "Corrosion." G. D. Bengough. 7 p.m.	Engineers' Club, Waterloo Street, Birmingham.
1	Institute of Metals (N.E. Coast Local Section): "Methods of Measuring Temperatures." C. E. Pearson. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
1	Hull Chemical and Engineering Society: "The Application of Surface Tension to Industry." J. Pryce-Jones. 7.45 p.m.	Grey Street, Park Street, Hull.
2	Society of Public Analysts: Meeting 8 p.m.	Burlington House, Piccadilly, London.
2	Society of Public Analysts: Papers by T. Hedley Barry, G. D. Elsdon, J. R. Stubbs, Paul Haas, and Barbara Russell-Wells. 8 p.m.	Burlington House, Piccadilly, London.
2	Royal Society of Arts: "Chemistry and the Supply of Drugs." Norman Evers. 8 p.m.	John Street, Adelphi, London.
3	Society of Chemical Industry (Bristol Section): Joint Meeting with the Chemical Engineering Group.	University, Woodland Road, Bristol.
3	Chemical Society: Ordinary Scientific Meeting. 8 p.m.	Burlington House, Piccadilly, London.
3	Institution of the Rubber Industry (Birmingham Section): "India Rubber as an Auxiliary to Suspension." Dr. F. W. Lanchester.	Grand Hotel, Birmingham.
4	West Cumberland Society of Chemists and Engineers: "A Visit to the Belgian Coalfield." L. Highton. 7 p.m.	Workington.
4	Wolverhampton Engineering and Scientific Club: "Application of Oil Fuel to Industry." T. F. Unwin.	Wolverhampton.
4	Oil and Colour Chemists' Association (Manchester Section). Joint Meeting with the Manchester Section of the Society of Chemical Industry: "The Contrasts of Colour—Hue, Purity and Luminosity." C. W. Gamble.	Manchester.

Chemical Plant and Engineering

Notes on Some Modern Types

In view of the large variety of the plant and machinery nowadays on the market, it is worth while occasionally to take stock of the situation, in order to obtain a comprehensive view of the available material and to note the new tendencies which are beginning to show themselves. Below are given notes of a number of types of plant, used for various operations in chemical works In order to cover the ground as far as possible, such matters as conveying, etc., which, although not strictly chemical are of great importance for the maintenance of the highest efficiency, are included.

Vapour Compression Evaporators

The evaporation of large quantities of water is a necessary operation in the preparation of a large number of products, both in the chemical and the food industry, and in many cases it is of the utmost importance that the water should be removed at as low a temperature as possible, in order to avoid the deleterious effect of high temperatures on the quality of the products. For example, glue and gelatine, albumen, milk, the juices of grapes, tomatoes, and lemons, and various other vegetable extracts, are liable to deterioration if unduly heated, and in the preparation of all these substances for the market the evaporation of water is necessary.

The most obvious method of reducing the evaporating temperature is to reduce the pressure of the space immediately above the boiling liquid, which is done by heating the liquid in a partially filled closed vessel, the pressure in which is reduced by means of a vacuum pump. Such an apparatus constitutes an ordinary vacuum evaporator.

The evaporation of large quantities of water, however, is a costly operation, owing to the high cost of fuel and labour, and to losses due to radiation and inefficiency of heat transference.

Radiation losses can be reduced to a minimum by careful design and lagging of the apparatus. Increased heat transference can also be secured by attention to the principles involved and careful construction in accordance with those principles; but when all has been done to increase efficiency by these means, it still becomes necessary to reduce operating costs in every possible way, and if increased operating efficiency can be secured without excessive increase in capital cost this would constitute a distinct saving.

The Multiple-Effect Evaporator, which utilises the steam produced by the water evaporated from the liquor undergoing treatment as heating medium in *other* evaporating vessels, has been brought to a high state of efficiency, and enables several pounds of water to be evaporated per lb. of steam supplied to the apparatus from outside; indeed, the latter is often used in the evaporator after having already done useful work in some other apparatus, such as a steam engine or turbine.

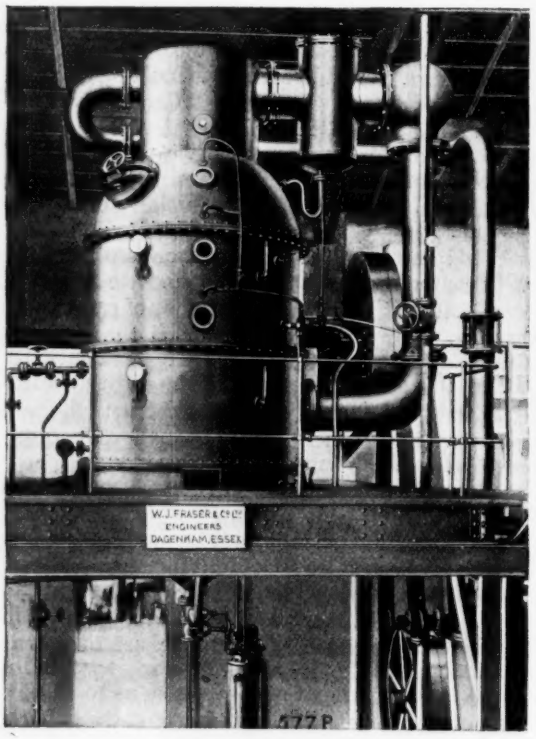
The rate of evaporation depends on the rate at which heat is supplied to the liquid under treatment. This, in its turn, is proportional to the product of the area over which heat exchange takes place, and the temperature difference between the source of heat and the liquid being evaporated. Hence, giving heating steam at a definite pressure and corresponding fixed temperature, and a liquid to be concentrated at as low a temperature as possible, the thermic head available for promoting the transference of the necessary amount of heat is defined, the boiling temperature being determined by the highest vacuum obtainable with a suitable vacuum pump.

In a Multiple-Effect Evaporator the thermic head has to be divided between the various "effects," so that the effective thermic head is reduced, and the total area for heat exchange has also to be divided between the several vessels. This results in a considerable increase in the cost of plant due to the multiplication of vessels.

It is therefore desirable, if it can be done, to obtain steam economy equivalent to that of a Multiple-Effect Evaporator by the aid of a cheaper plant, and the manufacturers of such plant immediately asked themselves whether it was possible to use the steam produced by evaporation to heat the liquid in *the same* vessel. Obviously, in order to do so, it is necessary to raise the temperature of the steam, which in the case of such liquids as we are considering, is at a lower temperature than the liquid from which it is produced, through a sufficient range of temperature to provide a thermic head for heat transference.

After many years' investigation of this problem a so-called heat pump has been evolved which will produce economically sufficient increase in the temperature of the evaporating vapours to provide an effective, though comparatively small, thermic head. The heat pump may either be operated by high pressure steam, preferably at about 10 atmospheres, or may be a turbine- or electrically-driven turbo-compressor.

W. J. Fraser and Co., Ltd., of Dagenham, supply evaporators of this type, in which part of the evaporating vapours is



VAPOUR COMPRESSION EVAPORATOR BY FRASER & CO.

exhausted by means of a heat pump and compressed to increase its temperature sufficiently for it to be sent into the heating chamber of the evaporating vessel.

The illustration represents such an apparatus. The heat pump, which is of the steam-operated type, is shown on the right. The excess of steam goes to the condenser, and the vacuum is maintained by means of the pump shown underneath the evaporator.

The use of a heat pump in this way makes it possible to effect considerable economies in steam and cooling water. The latter is an important factor in localities where the water supply is not plentiful. Instead of condensing the vapours not exhausted and compressed by the heat pump, they can, of course, be used to heat more liquor in a second or third vessel. A double-effect evaporator with a heat pump connected to the first vessel has a very low steam consumption, which is obtained at considerably less capital cost than an ordinary Multiple-Effect Evaporator of similar steam efficiency.

Centrifugals and Hydro-Extractors

The use of centrifugals and hydro-extractors is growing rapidly in this country and abroad, and home manufacturers are able fully to satisfy all needs in this direction. Plant of this type, for every conceivable use, is supplied by Thomas Broadbent and Sons, Ltd., of Central Ironworks, Huddersfield. Among other purposes their centrifugals are used in the chemical industry and allied trades, for the drying of crystalline or granular substances of every description, salts, soda, sugar, nitrates, crystals, anthracene, naphthalene, sulphate of ammonia; for foodstuff products (manufacture of dried milk), etc.; for extracting oil from palm fruit; in the laundry, dyeing, and dry cleaning trades; for separation, decantation, degreasing, etc. The company is over sixty years old, and more than 10,000 of its hydro-extractors are in use throughout the world. "Broadbent" hydro-extractors can be supplied suitable for steam, belt, water, electrical or friction drive, and can be fitted if desired with a patent automatic self-locking cover, whereby the machine cannot be started until the cover is closed, and cannot be opened until the cage comes to a dead stop. The illustration accompanying this note is a recent photograph of Broadbent's Centrifugal Machine No. 1 Erecting Shop, showing the assembly of 38 centrifugals of various types.

AN ERECTING SHOP AT THE HUDDERSFIELD FACTORY OF THOMAS BROADBENT AND SONS, LTD., SHOWING 38 CENTRIFUGALS IN COURSE OF ASSEMBLY.

The makers state that some of these machines are still working after 30 to 40 years of continuous service. The electrically driven ones have rotary in place of reciprocating parts, and this, combined with their strong construction, makes them very resistant to wear. In addition to the above, the company also manufactures electric cranes and capstans for railway sidings, dockyards, collieries, foundries, and the like, and also the "Broadbent" centrifugal clutch, which ensures easy starting of an electric motor against full load.

The use of centrifugal baskets for the drying of sulphate of ammonia raises an interesting point with regard to corrosion. Some years ago G. and J. Weir, Ltd., of Glasgow, the Monel metal specialists, suggested the use of this metal for use in these baskets. Results obtained since then indicate that it does indeed exert in this and other cases a strong resistance to corrosion, and there is a growing use of the metal. Monel metal baskets are being manufactured by many builders of hydro-extractors in Great Britain. It is claimed that Monel metal, which is a natural alloy obtained from nickel-copper ore, shows great resistance to acids, complete resistance to alkalies, resistance to abrasion, strength and toughness.

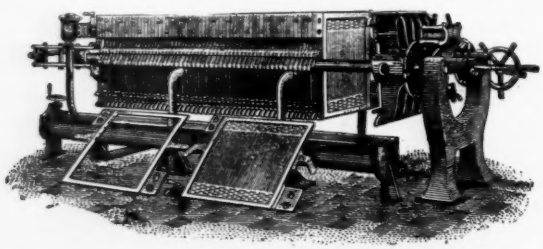
Filterpresses

The filterpress has been in use in the chemical industry for many years, and still remains the machine most usually adopted for filtration problems. This is due mainly because of the following advantages which it offers: (1) The largest possible filtering surface in the smallest possible space; (2) the material that is being filtered is rarely more than from ½ in. to 1 in. distant from the filtering medium, whereas with other methods only a comparatively small portion of the mass is near the filtering medium. In other words, the filtering surface of a filterpress is very large compared with the quantity of material that is actually being filtered at any given time; (3) in filtration, the question of pressure is extremely important, and with the filterpress this pressure can be varied from a slight gravitation pressure, obtained from a feed tank placed a few feet above the level of the inlet, up to 10 atmospheres, say 150 lb. per square inch, or even higher, if necessary; (4) simple construction and easy handling; (5) the ease with which anything soluble that is left in the cakes of solid matter can be recovered or eliminated without having to open the machine; (6) its durability: there is no part likely to wear out, nor are there any delicate parts likely to get out of order.

The "Dehne" filterpress has been on the market for a period extending over nearly seventy years, and something like 25,000 have been supplied and are in use in the largest chemical, paint, colour and other works, not only in this country but all over the world. In the "Dehne" filterpress the filtering surface is formed by vertical and horizontal ribs which are, by a special process, cast unusually deep: these ribs form an efficient support for the filtercloth, which cannot possibly sag to the bottom of the corrugations, and the filtration is thus not impeded in the slightest degree.

In the smaller sizes these filterpresses are closed with either a fixed or rotary centre closing screw, but in the larger sizes this closing is effected by means of an angle-lever shutting arrangement, by which something like a 1,500 fold transmission is attained, and the largest presses can be easily closed by one man. Another feature of these presses is what is known as the

thorough extraction washing system: by means of this the cakes can be washed in four different ways, but in the one most used the wash water enters at the bottom of one plate and finds its exit at the top of the alternate plate; this really means that a vertical sheet of wash water or other suitable solvent travels horizontally through each cake, pushing the soluble matter before it, and so efficient has this proved to be that in practical working the first runnings of the wash water are almost identical with the mother liquor itself. In addition to the ordinary type of press in iron the "Dehne" filterpresses are also made with the plates and frames of pitch pine or other suitable wood where acid liquors have to be dealt with: in these presses the channels through the iron headpieces and the valves are made of gunmetal or homogeneously lined with vulcanite, hard lead, etc., so that the material to be filtered cannot be affected in the slightest degree. In some cases of filtration the material has to be kept at a given temperature, either high or low: this can sometimes be done by warming the press by steam or hot water, and the material passing



A "Dehne" Filterpress, with thorough Extraction Washing System.

through immediately afterwards will keep the press at the required temperature. In cases where such a procedure is not sufficient presses can be supplied in which each plate is provided with an internally cast coil, through which steam, hot water or a cooling mixture can be passed. For good work in a filterpress it is very essential that the method of feeding should be correct, and the makers of the press supply specially constructed plunger pumps. These are provided with suction and delivery air vessels of ample size to insure a uniform feed, and in most cases the valves are of the ball type which are easily accessible by simply undoing one nut.

For dealing with liquors which must not come into contact with iron a special diaphragm pump is supplied. This is constructed so that the plunger never comes into contact with the material that is being pumped. The plunger works in water and is separated from the material to be pumped by a thick india-rubber diaphragm. All parts that actually come into contact with the liquor can be homogeneously lined with hard lead, vulcanite, tin, or some suitable alloy.

"Dehne" apparatus is supplied by the Premier Filterpress Co., Ltd., of Finsbury Pavement House, London.

Homogenisers and Colloid Mills

To within as recently as the beginning of last year emulsions of bitumen and bitumen-tar mixtures were regarded as being unproved as road dressings and binders. The last twelve months, however, have seen a widespread approval of the method. It is stated by the Sun Lane Engineering Works, of Shooters Hill Road, Blackheath, that their product, the Hurrell homogeniser, has been found to be peculiarly effective in preparing these emulsions, a considerable number having been supplied for the purpose both at home and abroad—France particularly. A rather interesting process recently developed is described by the company as a good illustration of the possibilities of the so-called colloid mills. This consists in making the "insoluble soaps" or fatty acid compounds of the di- and tri-valent metals by direct contact between aqueous suspensions of the metallic oxides or hydroxides and the chosen fatty acid. In spite of the fact that contact in the mill is only a fraction of a second, almost complete formation of soap is said to take place. The process is, of course, provisionally protected.

The securing of an effectual drive for these high-speed mills has always been a problem for the makers (and users), and until just recently the makers of the Hurrell machine have exclusively adopted a broad flexible belt, using an ample margin of pulley width. In several recent installations, however—including one to produce several thousand gallons per day of ice cream mixture—they have utilised the "Texrope" drive, a form of truncated V-shaped endless belt on multi-grooved pulleys, which can be at such close centres that motor and homogeniser may almost touch. This drive is only applicable to the two larger size machines, owing to the limitations of the diameters of the pulleys round which the "Texrope" belt will bend. Manufacture of the Hurrell homogeniser for distribution in Middle Europe has been commenced, under licence, by the Shroeder Co. of Lübeck, but it is pleasing to find the requirements of the United States are, in spite of the tariff wall, being met by machines made in London. A side line, about which details will shortly be available, and which it is hoped will fill the proverbial "long felt want," is a simple hand-operated emulsifier capable of producing a pint of stable emulsion in a couple of minutes. Apart from the chemical industry proper, it is anticipated that the appliance will be much used by caterers, confectioners, etc., for making synthetic creams from butter fat, etc.

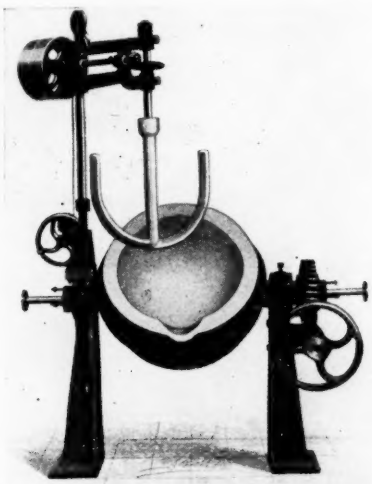
Owing to the increasing and sustained demand for the homogeniser the Sun Lane Engineering Works have decided to take larger premises, which will be entirely devoted to the manufacture of the homogeniser and supplementary and subsidiary equipment. The change over is likely to take place early in March.

Another mill which is capable of wide application is the "Premier" disintegrating and emulsifying mill, manufactured by Burt, Boulton and Haywood, Ltd., of Prince Regent's Wharf, Silvertown, London. In the last two years it has been applied to such purposes as the perfect emulsification of liquids; the intensive mixing of liquids and solids and the blending of difficultly miscible constituents in chemical preparations; the minute disintegration of solids suspended in liquids; the extraction of oils, *e.g.*, the extraction of tar acids from tar oil, pyridine from tar oil, etc.; the rapid and economical manufacture of paints and enamels and liquid suspensions of all kinds of pigments; the regeneration of milk from milk powders, and the production of synthetic cream from butter and milk powder; the wet grinding of organic chemicals, dyestuffs, etc.; the manufacture of pharmaceutical mixtures and emulsions of all kinds; and many others. One of the most important advantages in regard to this mill is there are no grinding surfaces to wear, as the whole of the disintegration is carried out by hydraulic forces. This practically eliminates wear and tear in the machine and brings the power required for driving down to a minimum.

The mill consists of an outer casing which surrounds a rotor. This rotor consists of a perfectly smooth steel cone which is made to extremely fine limits as regards accuracy, and fixed to a spindle which is mounted in special bearings. This cone works in close relation to a fixed surface, which forms part of the casing, the arrangement being very similar to the action of the clutch on a motor car, except that the two surfaces do not touch. The working surface of the rotor is arranged so that there is a very fine clearance between it and the surface of the casing. With this arrangement there exists a metal surface rotating in very close proximity to a fixed surface at a speed which may vary between 1,000 and 5,000 revolutions per minute. The rotor is driven by a pulley mounted on the spindle. The bearings which control this spindle are mounted in a micrometer head, and in the top casing of the machine immediately below the pulley. The micrometer head enables the clearance between the rotor and the cone to be adjusted to any degree desired. The rotor should never be adjusted so that it actually touches the casing, but it can be so regulated that the actual clearance can be anything from three-thousandths of an inch to two or three hundredths, according to the nature of the work to be done. The material to be dealt with passes through the narrow space between the conical surfaces in a fine film, and owing to the enormous speed of the rotor the particles of solid suspended in the film are rapidly torn apart. If two liquids normally immiscible are being passed through the film, their particles become so finely divided that they form an emulsion. The method of driving generally used is belt-drive, either direct from the motor or via a counter shaft.

Cast Iron Enamelled Chemical Plant

The illustrated catalogue issued by Danto-Rogeat and Co., Lyons, contains a very wide selection of cast iron (acid-proof) enamelled equipment for chemical industries. The Danto-Rogeat enamel consists of a layer of pure silica, free from all traces of metallic oxides. Although simpler methods of enamelling metallic surfaces are known, the firm have never departed from their delicate process of enamelling with purest silica, since even traces of foreign matter must be regarded as impurities which, when in contact with strong reagents, eventually cause the deterioration of the enamel. In this way the enamels also retain the white, natural colour.



CAST IRON ENAMELLED CHEMICAL PLANT (ROGEAT).

With the exception of hydrofluoric acid, which attacks silica in time, the Danto-Rogeat enamels resist the influence of all acids, at any concentration, even at ebullition. Some of their autoclaves delivered in 1915 to the powder mills of Saint-Fons and Angoulême for the manufacture of diphenylamine, and a number of enamelled kettles after having been day and night for six consecutive months in constant contact with concentrated nitric acid, are still in operation. The method of manufacture not only imparts to the silica enamel the characteristic acid-proof property, but also an insolubility in weak alkaline solutions, thus rendering possible the use of enamelled equipment in most chemical processes. Since these enamels are chemically neutral, impervious to water, and easily cleaned, they are essential parts in all processes involving valuable products of organic chemistry.

The Danto-Rogeat enamel is indecomposable by heat. Kettles lined with Danto-Rogeat enamel could be easily heated to 1,000° C. without injury to the enamel, were it not for the supporting cast iron base which approaches the softening point at the stated temperature. These properties would render silica enamel an ideal material for linings, if the exceedingly low coefficient of expansion (0·000000054) and its slow conductivity of heat did not entail great difficulties in the application. But owing to these qualities, cast iron is practically the only metal which may be safely enamelled with pure silica, and even this is possible only by taking special and extremely minute precautions.

The wide reputation of the firm is due to their experience in compensating the expansion and contraction between the enamel and the supporting base and in the selection of the proper basic materials which are essential factors in the manufacture, insuring the chemical neutrality, the resistance to acids, and the proper adherence of the enamel to the cast iron base. Premature wear is easily prevented by taking certain elementary precautions. In order to avoid cracking of the enamel the makers recommend in general steam or an oil bath, for heating. But direct heat may be also applied under the bottom, if care be taken not to heat too rapidly and by applying the flame evenly. All parts liable to come into contact with the compounds in reaction or with gases evolved are carefully enamelled. A slightly different enamel which, however, has similar resistant properties, is used for the agitators, blowpipes, thermometer-wells, etc. This enamel differs in appearance and colour from the one used for linings.

Danto-Rogeat and Co. have manufactured enamelled equipment for ninety years and made deliveries to the largest factories in the world. Besides their enamelling works they own an independent foundry at Lyons, where pieces weighing up to thirty tons are cast. This foundry is equipped with modern machine tools, a forty ton travelling crane, automatic charging devices, moulding machines, etc., enabling the largest apparatus needed in the chemical industry to be manufactured. The enamelling of the equipment is effected at the works at Lyons, 33-39, Rue des Culattes, where lead and tin-lined equipment are also made.

The illustration, one of a wide range shown in the catalogue, shows a jacketed tilting kettle and agitating device. Apparatus of this type is recommended in connection with viscous substances such as syrups, and compounds that give off offensive or toxic vapours.

Modern Grinding Machinery

In reference to grinding machinery in general, some interesting notes are supplied by J. Harrison Carter, Ltd. There are, of course, a large number of different types of grinders on the market, more or less suitable for dealing with most kinds of material that has to be reduced.

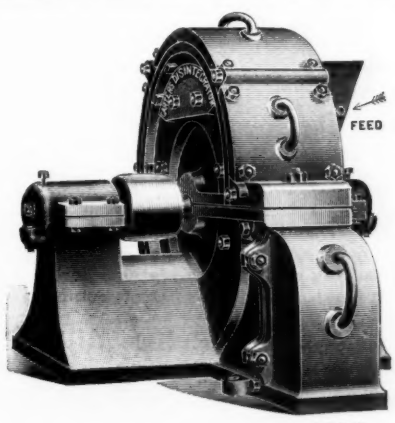
The advantages of the disintegrator as compared with other types of machinery are not as fully realised as they might be. The machine is small in view of the amount of work it can deal with; it is more cheaply made than slow-running mills, and it occupies less space and does not cost much to fix.

Instead of the grinding being effected by friction or rubbing, it is performed by percussion, and all the main objects of grinding are successfully attained. Briefly, these objects may be said to be:—

(1) Large capacity; (2) fineness and evenness of sample; (3) minimum of power used to secure the desired result; (4) low cost of machinery; (5) small upkeep costs; (6) little space required for plant; (7) minimum amount of labour and attention required; (8) adaptability; (9) simple erection.

Where a modern disintegrator is used, all these results are attained, and no other type of grinder has such a large capacity in proportion to the amount of power used.

Another type of disintegrator, having four screens instead of two as in the standard machine, is made, which has an advantage over the two-screen mill, inasmuch as the screening surface is more than double that in the standard



COMBINED DISINTEGRATOR AND DRESSING MACHINE.

machine and consequently, with materials of a friable nature, this type of disintegrator gives double the output with the same power as that obtained from the standard two-screen disintegrator; consequently, although the firm price the four-screen mill at more than the standard disintegrator, it is much more economical when dealing with suitable materials,

as the output is so much increased without having extra cost for driving power or attention.

Another type of grinder is the Carr type; this machine is very useful when dealing with all types of material of a more or less sticky nature, which it is impossible to grind in a disintegrator fitted with fine screens. This mill is especially suitable for dealing with superphosphate and all kinds of material used for manure purposes.

Different types of mixing machines are another of the Harrison-Carter specialities, and the firm's products also include roller mills, edge runner, magnetic separators, stone and other breakers, ball tube mills, oil cake breakers, bone crushers, etc. Full particulars are to be found in the firm's general catalogue, which will be supplied to any firm on application.

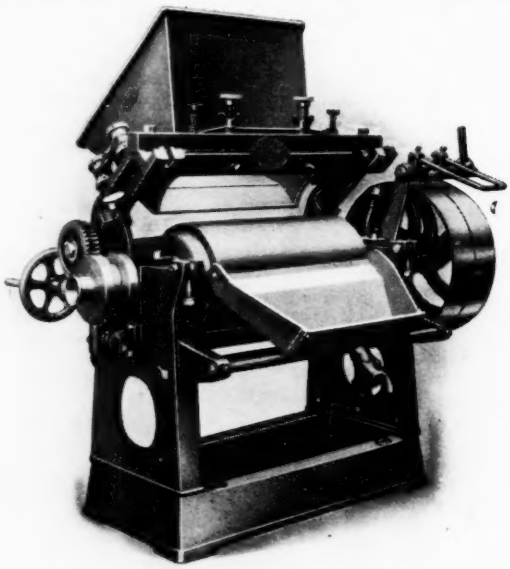
Mills for Grinding, Pulverising, etc.

There is considerable utility in a mill which combines in one frame the three often separate operations of grinding, dressing, and elevating. Such a mill, operating on the swing hammer principle, that is, shattering by impact and ejection of the material, is the "Miracle" mill, supplied by Mayhew, Ramsay and Co., Ltd., of 11, Victoria Street, London. An important result of the principle used is low power consumption. The grinding elements are composed of a battery of loose swinging hammers, held in position by bolts carried on discs, which are assembled on the mill shaft. When the mill is in operation, the hammers stand out to their full extent on the bolts and are held there by centrifugal force. They shatter in mid-air the material being ground. These hammers are one of the most important patented features of the master "Miracle" mill. They are specially manufactured and cast from high tensile manganese steel, so tough and hard that it is impossible to machine. The mill sieves whilst grinding, the lower half of the grinding chamber being fitted with a semi-circular, heavy, perforated steel screen. All accessory conveying machinery, such as elevators, conveyors, worms, etc., is rendered unnecessary with this mill on account of the fan or blower which is attached at the bottom of the main frame and driven by the endless belt from the mill shaft. The principal function of this blower is to remove all the ground product from the grinding chamber and pneumatically convey it through the piping to the tripod cyclone collector which separates the air from the ground material. The latter can either be sacked off from the toe of the collector or spouted from there to a bin. The cyclone can be placed in any suitable position near the mill or on a floor above, thus using the blower as an elevator. Several methods may be employed for feeding the mill, depending on circumstances and the class of material being handled. It can be done by hand, the feed table being adjustable. Another method is to build a hopper of timber or sheet iron over the feed table, with a regulating slide fitted to the outlet of the latter. If very regular feeding is required, a shoe feeder can be fitted, and in addition an elevator can be installed to handle automatically the material to the hopper or direct to the mill. The mill may be driven with any existing shaft or counter-shaft, or from an electric motor, tractor, or other prime mover. The makers claim that under normal conditions, the total cost of renewals averages less than 1d. per ton of material ground. Among the materials which are being successfully ground are charcoal, glucose, starch, glue, soap, asbestos, chemicals, sugar, fertilisers, limestone, oil cakes, oleaginous seeds, salt, sulphur, and many other materials. The company is prepared to arrange for demonstrations at its London plant, 15, Emerson Street, Southwark Bridge.

A Single Roller Mill

The single roller mill, manufactured by Sidney Smith and Blyth, Ltd., of 35, Garratt Lane, Wandsworth, has now been on the market for nearly five years. It is widely used in modern paint factories owing to the fact that it entirely eliminates the straining process, at the same time giving a superfine grind and imparting a fine gloss to the finished product. Its yield in relation to power requirements, etc., is claimed to be high. When using the single roller mill, state the makers, the process of paint manufacture is greatly simplified. In the case of white lead, it is only necessary to reduce the material to a liquid or semi-liquid state in a pug mixer before passing direct to the single roller mill, where all traces of tan or dross are eliminated and the product given a high gloss. The paint is then all ready for tinning up for sale.

A further use for which the mill is specially adapted is for reclaiming lost colour in linoleum factories. The colour to be reclaimed contains a considerable percentage of foreign matter of a fibrous nature, but after passing through the mill this is entirely eliminated and the material discharged is in a



A Single Roller Mill.

form suitable for further use. For grinding stiff pastes, etc., the two-roller mill now placed on the market is said by the makers to have many valuable properties. The combined plant and tandem two-roller mill is a comparatively new departure that is proving a great success. By means of the tandem two-roller mill great economy in floor space is attained, a considerably increased output, and the horse power and labour required are very much reduced as compared with other methods.

General Plant

Acid-proof chemical stoneware, like other resistant ware, is attracting a good deal of attention. It is supplied in all types by L. A. Mitchell, A.M.I.Mech.E., of 20, Cooper Street, Manchester—for example, in the form of tanks, receivers, towers, pipes, stills, absorption vessels, armoured stoneware centrifugal and plunger types, white stoneware for high temperatures and pure acids, etc. Mr. Mitchell also supplies miscellaneous chemical plant (centrifugals and hydros, compressors, and vacuum pumps, filters, grinding and pulverising mills, stills, etc.); drying plant of all types; furnace plants, and gas producers for all chemical products; and deals with the Martin process for the super-intensive production of sulphuric acid. This process has been worked in Spain, and is stated to have given good results.

Barrel-emptying and can-filling pumping sets for steel drums and wooden barrels are supplied by William Beardmore and Co., Ltd., of Coatbridge, Scotland, and 36, Victoria Street, London. One type of emptying set consists of a delivery pipe of cast iron; a hose-pump union of brass; a Beardmore double-acting semi-rotary pump, with close-grained cast-iron body and bronze internal fittings; a handle tang in forged Beardmore steel; a taper barrel adapter in aluminium-painted cast iron; a set-pin, to secure the pump in the suction pipe; and a galvanised malleable iron suction pipe. There are also more elaborate types with drip trays, delivery pipes, and gauze strainers. The company also supplies pumps—double-acting semi-rotary pumps, pumps for petrol, for special service, etc.

During the past few months the mining dispute has caused considerable dislocation in the iron and steel trades, resulting

in many cases in a complete cessation of normal production. Though this unfortunate state of affairs was forced upon The Leeds and Bradford Boiler Co., Ltd., of Stanningley, near Leeds, they determined to do their best to bring good out of evil, and seized the opportunity to remodel almost entirely the greater part of the plant in their workshops. This proved to be an exceptionally favourable time for the extensive alteration of plant. The Leeds and Bradford Boiler Co., Ltd., are well known as manufacturers of tar stills, tar distilling and tar dehydrating plant, vulcanisers, jacketed pans, etc., of high quality. They make a speciality of the manufacture of all types of chemical plant made of wrought steel plates.

Mixing and Grinding of Chemicals

Follows and Bate, Ltd., engineers, of Gorton, Manchester, have for many years specialised in the production of machinery, large and small, for mixing and grinding, and there are very few branches of the chemical and allied trades where one or both of these processes are not carried on.

In the early days of the company, their products were principally to be found in the works of paint, colour and varnish manufacturers, and these businesses are still specially catered for. Since that time, however, considerable developments have been made in additional directions, and specialities are now produced for use in both light and heavy chemical works, dye manufacturing, food products, linoleum, soap, calico printing, explosives, and other establishments.

The first speciality turned out for the paint trade was the Cone Mill, a crude article in its original form, which has been developed into the modern patent Universal Cone Mill with its micrometer adjustment, ball bearings, oil bath gear case, etc. This type of machine has been chiefly remarkable on account of (1) the volume of criticism that has been levelled at it since its inception, and (2) because, notwithstanding numerous attempts to produce machinery to displace it, it still more than holds its own. There are many really fine grinding operations in the paint trade for which the makers confidently claim this machine cannot be equalled, and there are probably more mills of this type in use in paint works than any other.

High-speed grinding has been much exploited during the past few years, mills having been placed upon the market variously described as "Colloid" mills, etc., and, notwithstanding drawbacks when dealing with certain classes of material, particularly those ground in viscous mediums, they have filled a long felt want in connection with emulsions, fine grinding in water and other fluids. Follows and Bate's patent "Circulator" mill is a notable example of this class of machine, and it has a rapidly growing list of users, not only in this country but in almost every European country and the British Colonies. Recently several repeat orders have arrived from the U.S.A.

Other productions include mixers for wet materials (both paste and fluid) and dry powders, as well as the ordinary range of better known types of grinding mills such as edge runners, triple roller mills, etc.

Aluminium Plant

The already wide use of aluminium as a metal for the manufacture of chemical plant of all descriptions is likely to be extended to cases where corrosion is thought to rule out its use by the work of Bengough and Stuart on the "Anodic Protection of Aluminium and its Alloys as a Protection Against Corrosion." In a small booklet, entitled *Aluminium As Applied to the Chemical Industries*, the Aluminium Plant and Vessel Co., Ltd., of Point Pleasant, Wandsworth, have compiled a list, based on their own 20 years' experience of aluminium, and the experience of a number of American and Continental authorities and users. The list gives a general indication of where and how aluminium may be profitably employed, and the company is prepared to give more specific information or to undertake experiments in particular cases. Among the many chemicals and uses for which aluminium plant is used may be mentioned acetic acid, cold or hot, of 95 per cent. strength and above (except anhydrous acid); acetylation; alum and aluminium sulphate; artificial silk; beer; benzoic acid; coke by-products; camphor; cellulose acetates; citric acid; colours; dyes and intermediates; explosives; foods; fruit preserving and bottling; hydrogen sulphide; margarine; milk and milk preparations; nitric acid; nitrous gases; many pharmaceutical products; petroleum; phthalic acid; rubber; sodium nitrate; sugar; turpentine; and many others.

The booklet above mentioned has many interesting illustrations, among them being a storage tank, acetic acid type, and acetic acid transport drums; acetylating stills; culture tanks for higher alcohols; evaporating steam pans for general chemical purposes; wood vessels lined with aluminium for brewery use; benzol stills; cast iron aluminium-lined steam jacketed pans; crystallising trays, etc.

Drying Machinery

Drying machinery of several forms, alike for steam, hot air, or vacuum systems, which are suitable for all kinds of chemicals, minerals, and all granular material, is made by Blake, Barclay and Co., Ltd., of Greenock, the sugar machinery specialists. This firm, established as long ago as 1858, is now applying its knowledge and resources to the needs of the chemical trade. Two types of rotary machines are made, one horizontal and the other vertical, each with a portable feed. In the former the material is fed in at one end and by means of the interior lifting blades and the rotary motion it is gradually brought forward to the outlet end, after which it may be cooled if required, and sifted, or packed direct. In the latter, the material is fed in at the top and gradually travels down over the surfaces of inverted cones, superimposed one above the other and rotating on a central shaft. The hot air for either system is supplied through an independent tubular steam heater and fan. The advantage of this system is that there are no steam joints near the material under treatment, and any moisture arising from drying the material is automatically expelled. All parts are accessible and the whole is of substantial design and intended for constant work.

The machines are made in various sizes and capacities, to suit varying requirements. In the vacuum system the vessel is of long cylindrical form, with means for conveying the material to be dried in and out, by means of bogies or trays on rails. This firm also specialises in bag filters, with either fixed or lifting heads, to suit special requirements in the chemical, oil, and other industries; these filters are built with steel or cast iron bodies and cast iron heads, and fitted complete with brass bottles and nipples, run-off and steaming-out cocks. These are made not only in the larger sizes, for regular works practice, but in specially small sizes suitable for experimental or laboratory use. Conveying and elevating machinery is another department in which the firm is active.

Evaporator Plant, etc.

The Kestner Evaporator and Engineering Co., Ltd. manufacture chemical plant covering a very wide range, and their products are widely known for reliability and efficiency. The Kestner Patent Film Evaporator is so well known that description is unnecessary, but a brief reference to other chemical plant in which this firm specialise may be of interest.

One of the latest developments is their Patent Spray Drier, which is particularly suitable for very delicate products such as milk, baby food, meat extract, etc. The finished material from this machine is in the form of a fine powder of uniform quality and absolutely unimpaired properties. A number of successful installations are already at work, and in addition a complete full scale experimental plant is available for demonstration and test purposes.

Another comparatively new development is the Kestner K.D. Base Exchange Water Softener, which has a number of advantages; it is used for household purposes and laundry work, and for supplying soft water to various processes, such as artificial silk manufacture. The Kestner Co. also specialise in other softeners such as the lime and soda type, but especially recommend their Patent Continuous Blow Down System for boiler feed softening, as this is cheaper in first and running costs and more effectually prevents scaling.

The Merrill Patent Oil Circulation Heating System manufactured by this firm is attracting increasing interest in chemical engineering circles. The number of installations made last year considerably exceeds that in any previous period of twelve months, and this record gives every indication of being beaten during the current year.

The Chemical Engineering Library: Second Series

Reviewed by P. Parrish, A.I.C., M.I.Chem.E.

We publish below short reviews of three important volumes in the Chemical Engineering Library, published by Ernest Benn, Ltd., at 6s. each. These volumes, which are part of the second series, are convenient in size, moderate in price, and designed to be of practical use to the chemical engineer.

(I) "Centrifugal Dryers and Separators." By Eustace A. Alliott, B.Sc., A.M.I.Mech.E., M.I.Chem.E. Pp. 151.
(II) "Modern Drying Machinery." By H. B. Cronshaw, B.A., Ph.D., A.I.C., A.R.S.M. Pp. 160.
(III) "Mechanical Draught." By J. E. Lister, Wh.Ex., Assoc.M.Inst.C.E., A.M.I.Mech.E., and C. Harman Harris, M.I.Mar.E., C.E. Pp. 158.

I.

This, one of the outstanding volumes of the second series, is typical of Mr. Alliott's usual treatment of a unit process of chemical engineering. His contributions on filter presses and drying are well known, and it will be recalled that they were marked not only by thoroughness, but by a wealth of fundamental knowledge and sound practical information. In this volume the author proceeds to his subject without any preliminary observations. On the first page one is inveigled into the consideration of formula relating to centrifugal force, because it is emphasised in the first three lines of Chapter I, "that the whole operation of a centrifugal dryer or separator centres round the rotating drum or basket." Should one be plunged into mathematical considerations in the very first page of a book, without some introductory observations on the general subject of the separation of liquids from solids, the latter of which need to be dried? Evidently Mr. Alliott thinks so. Others may differ. It is not always an easy matter to decide what kind of apparatus should be employed for certain products under certain conditions. Some think that ammonium sulphate crystals can be recovered from a magma with greater facility and dried at less cost by means of a rotary vacuum filter than by a centrifugal dryer. Others hold the opposite view. Equally, there are many other substances the separation and drying of which are the subject of uncertainty as to the best type of plant to adopt.

"Centrifugal Dryers and Separators" is a small book, and it must suffer from the defects incidental to a necessary compression. No one will dare to suggest that Mr. Alliott has not covered within the pages of this volume practically the whole gamut of the subject. The wonder is that so much ground has been covered. The treatment of preliminary or incidental aspects of the subject can hardly be expected.

Virtually, there are two parts to the book—the descriptive and the mathematical. The factors influencing drying and separating are discussed in a peculiarly interesting way; afterwards, the constructional details of a centrifugal are dealt with. Baskets, linings, methods of discharge, brakes, outer casings, bearings, fixed spindle and suspended machines, self-balancing machines, buffers, compensating devices, methods of driving—all call for treatment. Of the materials dealt with in centrifugals, laundry starched work, sulphate of ammonia, caustic mud, raw sugars, coal, sewage, and spent sumach waste are some of those that are cited. They certainly serve to reveal the diversity of the products which undergo treatment. Where the work of the centrifugal separator has to be made easier, pre-treatment of the liquor to be handled is provided for. The question of stabilising substances forming protective films on the surface of the particles by adsorption, and the tendency of many suspensions and emulsions to break up under centrifugal force, are suitably discussed.

The introduction of the mathematical aspect can be appreciated, and no apology is needed. After all, the rotation of bodies at high speeds must necessarily involve a mathematical treatment if the discussion is to be at all adequate. Many will consider that this aspect constitutes the distinctive feature of the book. It certainly adds to its usefulness. But the whole treatment of the subject is commendable, and it cannot be doubted that this volume will be widely read and studied.

II.

Dr. Cronshaw, in his introductory remarks, makes it clear that the term "drying," as used in his book, is confined to the removal of water from solid or semi-fluid materials by a process of evaporation, conducted at temperatures below the boiling-point of water. He proceeds to discuss the objects of drying, and remarks upon their diverse nature. So variable are the factors involved that it is somewhat difficult to outline the underlying principles.

Nevertheless, Dr. Cronshaw affords very valuable information on this aspect of the subject, and touches upon moisture content in equilibrium with the surrounding air, on diffusion towards the surface, the rate of movement towards the surface, which is governed by several factors, and on the reason why the laws governing evaporation from a free water surface are not strictly applicable to the evaporation of water from the surface of the body through the substance of which it is originally distributed.

Temperature, humidity, and air velocity are all the subject of separate treatment in the introduction. Subsequently, compartment and tunnel, natural draught, external fan, multiple circulating fan, agitator, rotary and vertical dryers, are each assigned a separate chapter. Here there is a wealth of practical information which cannot be other than extremely useful. Two further chapters are provided, one of which deals with machines for drying materials in long lengths, while the other is appropriated to film, spray, and vacuum dryers. The book is an extremely practical one, is provided with several useful illustrations, and contains valuable data. It is certain that it will be frequently consulted. The author is to be congratulated on the excellency of this volume.

III.

This volume is really a supplement to a previous one which the authors have written for this series, on the subject of "The Theory and Practice of Combustion." That there is need for a concise treatise on mechanical draught will not be denied. The information which has been compiled is really of a very practical character, and will be found to be most useful not only to chemical engineers, but to a large number of other technicians.

The book deals initially with natural draught, which it is known is inadequate and unreliable for many purposes. It is for this reason that there has been a growing tendency to resort to mechanical means, not only in connection with the combustion of fuels, but for many other operations where uniformity of conditions is demanded. Flow of air, mechanical draught, fans, measurement of draught and volume of air, and the general considerations governing the installation of mechanical draught, are treated in a very interesting and informative way. Not the least valuable part of the book are the tables and graphs provided. They should certainly prove to be extremely useful.

No reference is made to the movement of corrosive gases by mechanical means. This is essentially a problem in which the chemical engineer is interested. Whether it should have been treated in the book under review is a question which is open to doubt. The book maintains the high standard for which the series has become noteworthy, and it can be recommended as an essentially practical treatise.

Gas Purifying Tank Explodes

Eleven men were badly burned and five others injured in an explosion at the Tottenham Light, Heat, and Power Co.'s works in Willoughby Lane, Tottenham, on Monday. A number of engineers and workmen were examining a big concrete purifying tank through which the gas passes to extract the sulphur. They had lifted off the top, when there was an explosion, followed by a great burst of flame. The men, who were working a few feet up the tank, received the full blast of the flames in their faces before they could dash away. The company's firemen, who had been standing by in case of accident, found themselves almost powerless to cope with the flames. The brigade was summoned, but, finding that ordinary appliances were insufficient, the London County Council's latest chemical foam tank was brought into play.

Chemical Control in Industry

By Dr. W. W. Myddleton

A WRITER in an American contemporary* has recently pointed out that it is a very simple matter to be misled by the results of small scale laboratory experiments designed to standardise or control large scale manufacturing operations. It is, of course, well known to manufacturers that a product made in bulk usually differs materially from the article made under apparently identical conditions in the laboratory. If the laboratory process under conditions which may be designated by m yields a product having characteristic properties which may be summed up as p, it is impossible to predict with the certainty demanded by commercial requirements that the article made on the large scale under conditions n will have the properties $q = \frac{n \times p}{m}$, even where m and n are judged to be identical conditions.

Emphasis is placed by the American writer upon the further fact that if the ratios

$$m : p \text{ and } n : q$$

are determined by running small and large scale operations together so that a factor w can be estimated to give

$$q = w \cdot \frac{n \times p}{m}$$

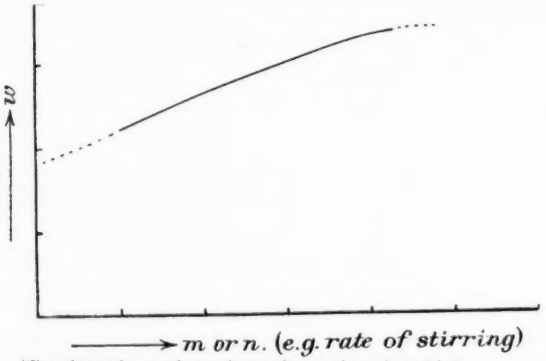
it is again impossible to predict the properties q^1 of a large scale product made by varying the conditions n to, say, n^1 (the alteration may be quality of material, charge, etc.), simply by running a small scale experiment employing as nearly as possible the conditions n^1. The modified equation

$$q^1 = w^1 \frac{n^1 \times p^1}{m^1}$$

is really based upon an entirely new set of ratios, the relation $m : n$ being different from $m^1 : n^1$.

Standardising Industrial Processes

A point that does not in the opinion of the present writer receive sufficient recognition is that by standardising industrial processes by parallel laboratory small scale runs it is possible to determine the value of the factor w, and to find how it varies with slight changes in the conditions. If the value of w moves in one direction as any one condition alters by small amounts in one direction it is safe to extend the variation of that condition to wider ranges on the laboratory scale and by estimating the value of w as one would mathematically by the graphical method (see figure), arrive at a prediction



The dotted portions show the regions in which w can be calculated by extending a fairly smooth curve.

of the properties of a large scale product without actually carrying out the large scale process. Again, one can use the method to establish what conditions should be imposed on the large scale to produce a given modification in properties.

Conditions on the industrial scale are frequently altered slightly, as when purity of material varies, and if small scale experiments were systematically run in parallel very valuable data might be collected. The observed values of w, mentioned in the preceding paragraph, would be repeatedly determined and the equivalent of the experimental error established. Experimental runs serve two extremely important purposes; they allow of the prediction of the conditions required to yield a product of given properties and in many cases they suggest that by altering the conditions in some defined direction the properties may be improved. The utility of the method depends of course upon the frequency with which small scale and manufacturing operations are run together and naturally upon the closeness and acuteness of the observation.

Scientific Methods of Control

It is now several years since a group of industrial chemists in this country were forced to the conclusion that the reluctance of many English manufacturers to employ scientific methods of control was based upon lack of appreciation of these features of small scale experiment, and in part upon unfortunate experience resulting from misunderstanding of the results of small scale work. They realised, moreover, that the value of small scale experiment was not generally appreciated. The result was that they started out, with little means but with big hopes, to bring the matter to the attention of as many small manufacturers as they could persuade to entrust them with chemical control of their processes. They met at first the rebuffs of those who trembled at the idea of allowing a chemist to prowl around the works, but little by little they established confidence and proved that the most highly prized trade secrets were safe in their keeping. They concentrated upon their business and took special pains to avoid the suspicion that they wished to probe into affairs which did not concern them. That, however, was their most formidable obstacle.

Their work did not clash with that of the public analysts; they were not interested in analysis as such and steadily refused to take such work as could be carried out by an analyst. Moreover they demonstrated in numerous cases that their work could be carried on by the average works chemist when once they had placed it on a firm basis, and many works chemists owe their introduction to them. The operations of the group are still on a modest scale and are at present confined to London. The reason for this is that they have consistently maintained their first resolve to act as propagandists rather than builders of fortunes. There is no doubt that the services these men are rendering will play an important part in course of time in maintaining the supremacy of British products.

* Washington Platt, *Journ. Ind. and Eng. Chem.*, Nov., 1926.

Leeds University Developments

AT the recent annual meeting of the Leeds University Court, it was reported that Mr. E. Walker and Mr. S. Wilson, of the Textile Industries and Dyeing Committee, had offered to provide two scholarships of £50 each, tenable for three years, and that W. and G. Foyle, Ltd., had offered £5 a year towards the cost of books. For the construction of the new laboratories which will be built in connection with the development scheme of the University various members of the staff have been granted leave of absence for the purpose of visiting and inspecting laboratories abroad, in order to secure adequate information. A gift to the University of nearly £200 for the endowment of a prize in pure chemistry, to commemorate Professor J. B. Cohen's work, has been made by the committee of the Cohen Testimonial Fund.

Fire-proof Kinema Film

A COMPANY has been formed to manufacture non-inflammable kinema film on a large scale by the Mallabar process. It is claimed that the film can be produced at a low cost, and that it possesses a tensile strength and a resistance to wear and tear equal to that of the highly inflammable standard celluloid films now in universal use, while the pictures produced upon it show to not less advantage than the latter film. The chairman of the Non-Inflammable Film Manufacturing Co., Ltd., is Sir H. E. Blain, formerly of the London Underground Railways group, while the board includes Sir John de F. Pennefather, M.P., of Liverpool, and Dr. Herbert Levinstein, formerly technical managing director of the British Dyestuffs Corporation.

Reviews

THE ESSENTIAL OILS: THEIR CHEMISTRY AND TECHNOLOGY. By Horace Finnemore, B.Sc. (Lond.), F.I.C. London: Ernest Benn, Ltd. Pp. 880. 70s.

This voluminous work is of that type which excites, in the first place, keen sympathy for the author, who has obviously been involved in the dual task of a very extensive search of the literature and of the collection and arrangement of a vast quantity of data in a systematic manner. The oils are dealt with in botanical sequence, and praise is due to the author and publishers for the admirably clear setting of the book. The description of each order or genus of plants, as the case may be, is commenced on a separate page. This, with a free use of varying intensity of type to differentiate both the relative importance of the plants as sources of oil and the occurrence of compounds of different relative importance in the oils, will aid the reader very greatly in obtaining a systematic acquaintance with the composition of these products of vegetable life.

The habitat of each plant is first discussed, with some description of the mode of cultivation employed, if any; in the case of the oils of greater technical importance statistics of production are generally given, with an outline of the method of collection and extraction of the volatile oil under consideration. Considerable attention is next devoted to investigations which have been carried out upon the chemical composition of the oil, the results being given in great detail together with the main analytical or synthetic arguments by means of which the constitution of the more important terpene derivatives has been established.

All of this is very excellently executed, and it is in no desire to be unduly critical that certain suggestions are offered, which, in the opinion of the writer, might make a work of this kind of even greater value than in its present form.

The title of the book indicates that it is written from the standpoint of the chemistry and technology of the essential oils. So far as the natural oils are concerned, the technology of their extraction is adequately dealt with, but owing to the arrangement of the text and in spite of the provision of a fair index, it is not altogether easy to find where the technical extraction of any particular oil is discussed. This difficulty might be met by means of a fuller index with ample cross-references, or better, by the production of a companion volume in which the technical processes used for the more important oils could be collected together. One feels, in short, that too much has been attempted in the effort to record all the data for each oil under one heading, but, at the same time, so far as the description of each oil is concerned, the general method pursued in the book as it stands is undoubtedly a good one.

Again, it is desirable both for the student and for the perfumery technologist to be in a position to review the essential oils from the standpoint of scent as well as from that of biological classification, but the only aid given in this direction is the table and accompanying matter on pp. xi-xv of the Introduction, wherein are briefly described from the point of view of their chemical constitution the main classes of compounds present in the essential oils.

The value of the main systematic part would be greatly enhanced by an additional volume covering the technical extraction processes of the really important oils (which are, of course, a mere fraction of those enumerated in the book itself) together with some account of the chief compounds of the terpene group which occur in these oils and of the work which has been done in determining their constitution (this is at present perforce scattered here and there throughout the volume). The more important synthetic substitutes could then also be discussed with advantage at some length, whereas, beyond a general discussion of the economic factors which govern the competition between natural and synthetic products, there is little information to be derived on this important group of perfumer's raw materials in the book as it stands. Admittedly the synthetic products stand somewhat outside the scope of the volume, which is evidently designed as a compendium of information on the natural products, but nevertheless many of those who consult Mr. Finnemore's valuable work will do so in search of information on a specific perfume material, whether natural or synthetic.

If one may make a further criticism, it will be in reference to the long descriptions of researches on the constituents of the individual oils. In some cases these might have been pruned with advantage; in others the data are sufficiently contradictory to render a recital of each investigator's results probably unavoidable. Yet one feels that the volume would have gained in clarity and ease of mental assimilation had free and full use of tabular methods of expression of the data been adopted in nearly all cases. This would also have given prominence to what the author will probably agree is a common defect in the investigation of essential oils, namely, the almost entire absence of any attempt at a quantitative assessment of their chemical composition.

So many workers have been obsessed by the isolation of traces of minor constituents that very close examination of the data is necessary to arrive at a true perspective of the proportions of the main components; for example, on p. 567 there is a classified list of 43 constituents of eucalyptus oil, but it is almost impossible to ascertain within a limited time the average proportions of any of them; on p. 263 the components of Ylang-Ylang oils are given as *d*-pinene, creosol, eugenol, isoeugenol, eugenol methyl ether, *p*-cresol methyl ether, linalol, geraniol, benzyl alcohol, benzyl acetate, benzyl benzoate, methyl benzoate, methyl salicylate, methyl anthranilate, cadinene, safrole and an odourless sesquiterpene alcohol, m.p. 138°, it having presumably been found impossible to obtain any kind of quantitative record.

Many people seem to admit no mean between "atomic weight accuracy" and sheer chaos; it is appalling to reflect how much work will have to be done over again merely in order to obtain quantitative data of an approximate, but quite useful, order both in this field and the allied one of the fatty oils. No further original investigations on the composition of natural oils should be published without a reasonable effort being made to give some sort of quantitative statement of the components found to be present.

Congratulations are due to Mr. Finnemore for having carried to completion what must have proved at times to be a tedious undertaking; his labours will materially smooth the path of those who are in search of information on the nature of the plant essences.

T. P. HILDITCH.

EVAPORATION. By Alfred L. Webre, M.E., and Clerk S. Robinson, S.M. New York: Chemical Catalog Co., Inc. Pp. 500. $6.00.

This book is divided into four sections, of which the first deals with theoretical considerations in connection with evaporation. Some interesting data are given on the question of heat transfer coefficients, which show how they are affected by different factors, such as viscosity, static head of liquor, steam temperature, etc. It is unfortunate, though unavoidable, that available data on this question give only the value of the over-all heat transfer coefficient, so that the individual film coefficient for the liquor can only be roughly obtained by deduction.

There is an excellent chapter on heat balance in evaporators, and various examples are worked out in detail taking different feed cycles, thus showing the most economical arrangement that should be adopted under the conditions assumed for the examples. The information given is sufficient for heat balances to be worked out under every condition, and the authors wisely warn readers that the conclusion arrived at as to the most economical cycle applies only to the assumed conditions that they have taken.

Short chapters are devoted to the various items of evaporator design, such as the size of vapour pipes, the question of liquor circulation, design of separators and the prevention of entrainment. Particularly interesting is the chapter on natural and mechanical circulation of liquor and its effect on the rate of evaporation. It is to be regretted, however, that in this case the information applies only to pan-type evaporators. It would have been interesting to have figures comparing these with film type evaporators.

General information is given in Section 2 on the operation of evaporators and their accessory plant.

The chapters on vacuum pumps, condensers and evaporating plant are of necessity brief, but they would serve as a useful guide to consulting a standard work on such items.

The third section should prove most useful to all concerned

with evaporators. Heat balances are treated in great detail for multiple effect evaporation of the liquors encountered in various industries, such as cane sugar, beet sugar, and paper mill waste liquors. Specific problems are treated at great length, giving detail figures with different arrangements of feed and with a varying number of effects, thus enabling the most economical system of operation to be obtained.

The chapter on the treatment of glycerine liquor and its evaporation appears to be based on the experience of one type of evaporator only.

Section four, which deals with various types of evaporators that are met with in practice, does not seem to come up to the high standard set up in the previous sections of the book.

Short chapters are devoted to each type of evaporator, which are contributed by makers themselves. Whilst this no doubt gives information as to the general differences of various types of evaporating plant, it would have been of more practical value to include a general discussion as to the merits of the different types for certain specific examples, and any comparison based on actual data would be most valuable.

This book should prove a most valuable work to all interested in evaporation. The author is specially to be congratulated on treating the question of heat balance and heat transfer in such detail, and on the numerous examples that have been worked out.

J. Arthur Reavell.

Synthetic Rubber. By S. P. Schotz, D.Sc., F.I.C. London: Ernest Benn, Ltd. Pp. 129. 21s.

Dr. Schotz's work consists substantially of a preface, three chapters on raw materials for the production of synthetic rubber (isoprene, butadiene and dimethylbutadiene respectively), chapters on polymerisation, vulcanisation and stabilisation, and finally sections dealing with "properties and constitution of natural caoutchouc and synthetic rubber," and the history of synthetic rubber. If we omit from consideration for the moment the opinions on and statements relative to the economic and industrial aspects of the subject, as expressed in the preface and elsewhere, and regard the book solely from the scientific point of view, Dr. Schotz may be congratulated on having put forth an excellent monograph. The matter is well arranged, and the illustrations—so far as they refer to the subject specifically—are suitable and truly descriptive of the processes involved, and the work as a whole is neither scrappy nor excessively long. On the question of the *quality* or nature of the various grades of synthetic rubber hitherto produced, Dr. Schotz is scarcely as critical as might be expected; whereas, for instance, in some parts of his book he broadly refers to some of the defects or disadvantages of synthetic rubber, he quotes in others, without comment, statements which have been made from time to time that excellent tyres have been made from synthetic rubber, that it is in all respects at least as good for ordinary purposes as the natural material, etc. As a result, as it seems to the reviewer, a somewhat erroneous impression on the question of quality might be formed in the mind of the layman in this connection. In his preface, Dr. Schotz states, quite without reserve: "Synthetic rubber will *therefore* inevitably become one of the most important branches of industrial organic chemistry. By utilising timber, coal, chalk, peat, shale, oil, and tidal and water power, the world will become independent of the tropical countries for the production of this necessity of modern life." The word italicised, "*therefore*," refers to limitations supposedly forced upon the expansion of the plantation industry by considerations of time, space, and (artificial) restrictions, etc. With such statements the reviewer is entirely out of sympathy. If synthetic rubber of a kind comparable with the natural article is ever produced, it can, in his opinion, at best act as a check on too high a price resulting from natural or artificial conditions—but no more. Dr. Schotz may well reply that it is but a question of his opinion against that of the reviewer, but the latter believes that the best informed technical opinion is overwhelmingly with him in the view he takes, and that it is not desirable that capital and labour should be expended on practically hopeless problems, when so many promising ones await solution.

P. Schidrowitz.

A Text-Book of Organic Chemistry. By Dr. Julius Schmidt. English edition by H. Gordon Rule, Ph.D., D.Sc. London and Edinburgh: Gurney and Jackson. Pp. 798. 25s.

For the advanced study of organic chemistry, and for purposes of reference, a book is required which, while much greater in scope than an elementary work, is compressed into smaller compass than complete treatises on the subject; the present volume, an English version of Schmidt's *Kurzes Lehrbuch der organischen Chemie*, is planned on these lines. The subject is treated in the usual divisions, into which are introduced discussions of special branches of organic chemistry and of aspects of recent organic research. These include accounts of the present state of knowledge of the structure of cellulose, of the vegetable alkaloids, of the proteins, and of chlorophyll and other plant pigments.

In one or two points the treatment offers evidence that there is still too much segregation of the various branches of chemistry. In discussing the stereochemistry of nitrogen, it is stated (p. 43), in regard to the inequality of the five valencies, that "Meisenheimer assumes the five radicals to be attached to nitrogen by means of principal valencies, four of which are in an inner and one in an outer zone. . . . It is supposed that the group in the outer zone, at all events when the substance is in solution, resembles the labile group of a tautomeric compound in having no fixed position, and has therefore no apparent influence on the asymmetry of the molecule." This complicated view is unnecessary, as it is certain that the nitrogen atom with four attached groups forms a complex cation, the fifth group forming the fully-ionised anion, which in solution has no connection with the rest of the molecule. This particular point illustrates how necessary it is that organic chemists should keep abreast of modern developments of our views of atomic structure. The Lewes-Langmuir theory and kindred views especially should be of great assistance; they indicate clearly the distinction between, on the one hand, electron-sharing, which results in the formation of compounds, and, on the other hand, exchange of electrons, resulting in the formation of ions, which, at any rate in solution, are not connected with one another. It is of course true that dynamically (as regards the study of spectra, etc.) such theories break down, and it will be necessary to bring them into accord with the views of Bohr and his school; but as far as structural and stereo-chemistry are concerned, their general application could not but result in much greater clarity of thought and possibly in considerable stimulus to research. A further point worth noting is the statement (p. 277) that "the nature of the blue compound known as iodide of starch has not yet been determined." The available evidence points to the fact that the blue colour is simply due to adsorption of iodine on the surface of the starch, and not to the formation of a definite compound. The elaboration of these points will not, it is hoped, be regarded as destructive or unfriendly criticism; they merely serve to illustrate the fact that there is still a tendency to keep the various divisions of chemistry (organic, physical, etc.) in water-tight compartments, instead of allowing them to mingle and react upon one another.

The translator has taken advantage of the provisional findings of the International Union of Pure and Applied Chemistry in regard to the numbering of organic ring systems to "rearrange the formulæ of heterocyclic compounds in conformity with the proposals set forth." In general, the book contains a large amount of information, and should leave the reader in a position to study with advantage treatises on special branches of the subject.

F.

Power Production from Town's Refuse

The subject for discussion at the joint conference at Bristol on Thursday, February 3, of the Chemical Engineering Group, the Bristol Section of the Society of Chemical Industry, and the Fuel Section of the Society, is "The production of power from town's refuse," which will be introduced in a paper by Messrs. J. W. Reber and A. Scott. The chairman of the Bristol Section (Mr. George Gray) will preside, and will be supported by the chairman of the group (Mr. F. H. Rogers), and the chairman of the Fuel Section (Professor A. Smithells). During the visit an inspection will be made of the cocoa and chocolate works of J. S. Fry and Sons.

Professor Cumming and the Institute of Chemist-Analysts

To the Editor of THE CHEMICAL AGE.

SIR,—"What does he know of England, who only England knows?"

Professor Cumming does not know, or does not wish to know, that chemistry was not born in England, but started with Esculap and Galen, as far as records go; that in Great Britain the only people entitled to the name of "chemist" by law, education, experience, and public custom, are the "chemists and druggists," or, as Professor Cumming likes to call them, the "pharmacists," and they are permanently in touch with chemistry; that the Pharmaceutical Society neither created pharmacy nor chemists, but the other way about.

We chemists have no objection if Professor Cumming or any of his Fellows of the "mushroom" Institute wishes to dabble in commercial analysis, neither are we going to pass an opinion as to their qualification for that sort of work. But when one undertakes the analysis of drugs and pharmaceutical preparations, he is expected to be fully experienced and qualified in pharmacy, *materia medica*, galenical and pharmacopœial preparations. Indeed, one wonders how many of the so-called analysts have ever handled the British Pharmacopœia.

When Professor Cumming appeals to the intelligence of your readers with his quoted figures he relies upon his intuition that—*Hominis stupiditas suprema lex*. A genuine chemist knows that chemistry is neither mathematics nor physics, the same as commerce is neither correspondence nor shorthand.

His letter would have been more interesting had he given us figures of his fellow members elected by examination. As he left it to me, I can do no better than to quote the following figures published by a contemporary paper not very long ago, under the description of "A Superior Diploma Mill": "Since 1919 290 new Fellows have been created; of these only 32 passed both tests. Of the remainder 180 were excused the tests for the Fellowship and 66 passed neither of the examinations."

Professor Cumming and others who are too prone in adopting initials after their names may calculate for themselves the percentage of the Fellows who got in by examination, and consider what the actual values of those initials are.

Another piece of information which might interest Professor Cumming is the existence of an Institute of *real* Chemist-Analysts, and when he is in a position to show that he is a "legally" qualified chemist, he can apply for membership to its hon. secretary.—Yours, etc.,

JULES COFMAN-NICORESTI.

Studley House, Larkhall Lane, S.W.4.
January 25.

[We have no wish unduly to intervene, but what would our correspondent say about the position of senior official analyst to the Home Office, just vacated by the death of Mr. John Webster, or that of Government Chemist, held by Sir Robert Robertson? Would he say that these are "jobs only for pharmacists," as he contended in his first letter?—ED., *C.A.*]

Pharmaceutical Analysts

To the Editor of THE CHEMICAL AGE.

SIR,—The letter of Mr. Cofman-Nicoresti, M.P.S., in a recent issue of THE CHEMICAL AGE (January 8), should go far to remove from the lay mind a grave misapprehension regarding pharmacists, existing in the days of Chaucer and persisting to the present day, "Each helpe the other for to winne. . . . And gold in Physic is a cordial, therefore he loved gold in special" (Chaucer, *Prologue*). The multitude of the present day, we fear, think of the pharmacist in the terms of the Insurance Act: A.D.T. + Aqua Pura.

But this is evidently wrong; the main business of the gentleman behind the counter who sells tooth-brushes, safety razor blades, brilliantine, face powder, vanishing cream and bath salts is one of analysis. Now, of course, the failure of our University chemistry courses becomes understandable, for we cannot recall a single University teacher of chemistry who can boast of the letters "M.P.S. (by Examination)" to his name. Now, also, we can comprehend the failure of our chemical industries, for we know of no firm who employs an M.P.S. for an analyst.

Our ignorance of these grave facts has, however, arisen from our chemical upbringing and environment. How could we, who sat at the feet of professors who were F.R.S.'s and learnt our methods of analysis and investigation in laboratories which are world famous, ever hope to acquire that technique and accuracy in experimenting which arises from pasting labels on bottles in a shop and mixing medicines under the direction of a qualified medical man?

One or two points are, however, still obscure, but Mr. Cofman-Nicoresti, Member of the Pharmaceutical Society of Great Britain, may further enlighten us. Why do we have a Society of Public Analysts and an Institute of Chemistry, and why has the University of London only recently decided to institute a Bachelor of Pharmacy Degree in the Faculty of Science?—Yours, etc.,

"CONSULTING CHEMIST AND ANALYST."

Chemicals at British Industries Fair

THE exhibit organised by Imperial Chemical Industries at the British Industries Fair, London, on February 21 to March 4, will include the principal chemical and allied products made by the four constituent companies. A large stand measuring over 1,200 square feet has been designed and will consist essentially of a series of steps on which will be seen the products of the various companies. Two imposing entrances will lead into a hall where exhibits showing the wide influence of the companies will be inspected by the visitors at their leisure, and this hall will provide a conference room for exhibitors' representatives and inquirers. In it will be a specially arranged office for the convenience of those making confidential inquiries. The public will be able to visualise by means of a flow sheet (on which the actual articles will be shown) the inter-connection of the various companies, and the inter-alliance of their various products in almost every industry in the world. For example, coal will be shown, not only as a fuel, but as the basis of numerous other products. Similarly, Brunner Mond and Co., and the United Alkali Company will show how salt as a basic raw material is treated and how it forms a base for other commodities. Nobel Industries will have an attractive display of all their products, while the British Dyestuffs Corporation are showing in a practical exhibit some of the mysteries of the manufacture of dyes and colours. The companies comprising Imperial Chemical Industries have already supplied the Board of Trade with a large number of possible buyers in all parts of the world and invitations have been despatched by the Government to these names and addresses.

The complete list of exhibitors in the Chemical Section of the Fair includes the Acme Chemical Co., Ltd. (Stand A 28), Albright and Wilson, Ltd. (A 14 and 15), Frederick Allen and Sons (Poplar), Ltd. (A 2), A. Boake, Roberts and Co., Ltd. (A 8 and 19), Boots Pure Drug Co., Ltd. (A 6), The British Drug Houses, Ltd. (A 11 and 16), W. J. Bush and Co., Ltd. (A 7), Joseph Crosfield and Sons, Ltd. (A 22), The Erasmic Co., Ltd. (A 21), The Gas Light and Coke Co. (A 12), The Graesser-Monsanto Chemical Works, Ltd. (A 24), Hopkin and Williams, Ltd. (A 3), Howards and Sons, Ltd. (A 5), Imperial Chemical Industries, Ltd. (A 10 and 17), Johnson and Sons, Ltd. (A 27), May and Baker, Ltd. (A 9 and 18), Thomas Morson and Son, Ltd. (A 4), Salt Union, Ltd. (A 23), The South Metropolitan Gas Co. (A 15), Thomas Tyrer and Co., Ltd.) (A 25), Whiffen and Sons, Ltd. (A 1), Williams (Hounslow), Ltd. (A 26), Office of the Association of British Chemical Manufacturers (A 20).

Industrial Chemist Sent for Trial

ROBERT BROWNLOW, 49, industrial chemist and engineer, of the Hendon Scientific Laboratories, Brent Green, Hendon, was charged, on remand, at Bow Street Police Court on Saturday, January 22, before Mr. Fry, with obtaining credit to the amount of £5,000 from Mr. E. O. Schwarz, merchant, without disclosing the fact that he was an undischarged bankrupt. The charge had originally been one of false pretences, but all allegations of fraud were later withdrawn. After Mr. Schwarz had given evidence, two other cases of obtaining credit for goods of the total value of £836 without disclosing that he was an undischarged bankrupt were gone into against Brownlow. Brownlow, who pleaded "Not Guilty" and reserved his defence, was committed for trial. Bail was allowed.

Mr. Carr on British Chemistry

Importance of Corporate Action

THE joint annual dinner of the Society of Chemical Industry and Institute of Chemistry (Birmingham and Midland Section) took place at Birmingham, on Saturday, January 22. Mr. J. C. Mann presided over a large and representative attendance, which included Professor G. G. Henderson and Mr. F. H. Carr, president of the Society of Chemical Industry.

Replying to the toast of "The Society," Mr. Carr said that the Society of Chemical Industry exercised a profound influence upon them as chemists and upon their work, because without it they would feel they were working in an individualistic way for rather selfish ends, but by the Society's aid they were able, themselves, to make a contribution, and to realise their part in serving the community. His experience among those serving on the councils of the various chemical societies was that they were actuated by the one unselfish motive of doing their best in chemistry for the national interests. Recently the League of Nations, in planning an economic conference, sought a report on the world position of the chemical industry. They, in this country, heard nothing about it, neither did those in France, until it transpired that it had been considered in Geneva. Apparently it was thought that the only people who counted in chemical science and industry were the Germans, and they presented a report, which it would appear was intended to cover the whole ground.

Implications of the German Report

It was a careful and able report, but the position was exaggerated by the suggestion that outside some heavy chemicals which could be left to others all the rest could be perfectly easily provided by Germany. It was urged that the development of the dye industries in various countries would have the effect of depriving the world of cheap articles in that overhead charges would be made unnecessarily high, and that the desirable thing was that such manufacture should be segregated in one or two countries. That information came to the knowledge of the Association of British Chemical Manufacturers, and the whole position had been brought under review by the various interests in the chemical industry. He was able to say that a statement on the whole matter had been printed and delivered within two or three weeks of the receipt of the German report he had referred to, and the statement made it perfectly clear to those in Geneva that the position was not quite as one-sided as their German confrères had suggested. He had only mentioned this matter because he wanted to make it clear that action in a corporate way would not have been possible if they had not had the Society of Chemical Industry and the other professional organisations, and the Chemical Employers' Federation and the Association of British Chemical Manufacturers.

Public Ignorance of Chemistry

Professor Henderson, in reply to the toast of "The Institute," said it was a pleasure to meet the president of the Society of Chemical Industry, because he felt that in Birmingham, as elsewhere in the country, there was prevalent a desire for unity between every branch of the profession; in other words, for co-operation in every possible way between chemists of every kind. Unfortunately, the great majority of their fellow citizens were supremely ignorant of the importance of chemistry from the national point of view. Therein lay a danger, in his opinion. Unless their industry was prosperous the country must go down. Therefore he believed it was their duty, individually and collectively, and with the aid of their various societies, to educate the general public. If such education were to be successful, they must go outside the region of the scientific journal, which was not read by the man in the street. Almost everybody read the newspapers, and it seemed to him that very valuable propaganda work could be done by utilising the press in the localities in which the chemist lived, by the writing of scientific articles dealing with new developments in chemistry in popular language. In Glasgow much useful work had been done in that direction. It was not a case of magnifying their profession; it was done simply with the idea of changing the attitude of the public mind in relation to men engaged in scientific work. The time for action had arrived.

Modern Industrial Chemistry

An Address by Mr. R. S. Horsfall

AT a meeting of the Manchester Section of the Society of Dyers and Colourists held on Friday, January 21, a paper on "Modern Industrial Chemistry" was read by Mr. R. S. Horsfall, M.Sc. The lecture was chiefly concerned with the organic chemical industry.

Mr. Horsfall stated that the progress of chemical industry depended upon three main factors: (1) The human factor; (2) the raw material; and (3) the factor of opportuneness. Human progress would appear to travel by stages through observation and imitation to creation. Imitation was the strongest feature of the majority of human beings, and was marked in chemical industry by imitation of many products occurring naturally. Artificial silk was an interesting case of imitation of natural products, for its manufacture involved using the substance (cellulose) of one fibre (cotton), and the spinning process of another—natural silk. Artificial silk made from acetyl cellulose might well be the stepping-stone to the creation of new fibres.

The factor of being opportune had lost most of its former importance for the reason that the huge present-day chemical firms, with their unlimited resources, provided a ready market for anything and everything that the chemist might discover.

Chemist, Physicist, and Engineer

There could be no doubt that the development of organic chemical industry had been in large part due to the phenomenal financial success of the dyestuff industry. It was essentially a chemists' industry, and had therefore always employed a large number of chemists, and its financial success had enable it to finance many outside workers and to provide a market for and a means of development of new ideas. There came a time when it was obvious to the far-sighted leader that dyestuffs would not continue to return the scale of profits to which the dyestuff industry was accustomed. Following the policy which had been so successful, they set to work to imitate products already well known in other fields. The most important feature of such development was the inclusion of physicist and engineer, and to-day ammonia synthesised from nitrogen and hydrogen, synthetic alcohols, and synthetic urea, at an extraordinarily cheap price, had resulted from the combined endeavours of chemist, physicist, and engineer. The problem of the production of a liquid fuel from coal was at present in process of being solved. In a similar manner, the development of what were looked upon as distinct and separate chemical industries a few years ago had gradually revealed the truth that there was in fact no sharp separation. From this revelation had sprung the German I.G. and the British Imperial Chemical Industries.

Samples of artificial silks and textiles made from them, plastics including the latest synthetic resin from formaldehyde and urea, together with finished materials made from such substances, were shown by Mr. Horsfall, as well as hard fats from vegetable oils, nitro-cellulose lacquers, dyestuffs, and perfumes. Not all these discoveries or developments were attributable to the dyestuff industry, nor would the formation of Imperial Chemical Industries place this country in its rightful position. A scientific industry could only be wholly successful in a scientifically minded country. It was, therefore, with unbounded interest that those who were associated with chemical industry had seen the formation of the research organisations which were now attached to various industries. Slogans were dangerous, but "Experiment" would appear to have at least an equal value with the much more widely advocated one of "Produce," and such research organisations offered a means of combining the two, and thus of overcoming the difficulty of what might be an incompatibility in an individual concern.

The Indoor "Impervo" Thermometer

FROM Negretti and Zambra, London, we have received a very neat type of indoor "Impervo" thermometer, suitable for private rooms or offices. It is strongly made in white enamelled metal, and can easily be hung at any convenient point on the wall. The temperature range is from 40 to 90° F., and the limits of healthy temperature, 55 to 65°, are shown by an indicator.

From Week to Week

PRINCE GINORI CONTI has had conferred upon him the honorary degree of D.Sc. of the University of Pennsylvania.

PROFESSOR R. WILLSTATTER, of Munich, has been invited to lecture at the University of Harvard in the spring of this year.

THE FARADAY MEDAL for 1927 has been awarded by the council of the Institution of Electrical Engineers to Professor Elihu Thomson, of Boston, U.S.A.

THE TERCENTENARY of the birth of the Hon. Robert Boyle, famous for his researches on chemistry and physics, occurred on Tuesday, he having been born on January 25, 1627.

MR. C. W. WOOD, A.I.C., honorary secretary of the South Wales Section of the Institute of Chemistry, is leaving the South Wales district. His services are to be acknowledged by a presentation.

RATES OF CUSTOMS DUTIES on goods imported and exported from British India, including duties on chemicals, drugs and medicines, are given in detail in a supplement of the *Indian Trade Journal* for December 30, 1926.

INDIGO EXPORTS from India in November, 1926, amounted to 57 cwt., as compared with 252 cwt. for November, 1925. For the period January to November the exports were 1,909 cwt. in 1926, and 1,631 cwt. in 1925.

PARADICHLORBENZENE, in the form of a mixture with 5 parts of vaseline, is said to be giving good results in the treatment of animals suffering from attack by the warble fly. The mixture is injected under the skin.

MR. NORMAN EVERS, B.Sc., F.I.C., will speak on "Chemistry and the Supply of Drugs" before the Royal Society of Arts, at John Street, Adelphi, London, on Wednesday, February 2, at 8 p.m. Mr. F. W. Gamble will preside.

THE CERAMIC SOCIETY, on behalf of its members, is arranging a visit to Czecho-Slovakia. The party making the trip will leave London on April 30, and will return in two groups on May 14 and 16. Visits will be made to works and places of interest at Karlsbad, Prague, Vienna, and Brünn.

THE PATENT FUEL INDUSTRY at Swansea appears to be showing a distinct revival, and manufacturers are optimistic of the industry shortly regaining its former strong position. Five large steamers were commissioned last week to take cargoes of patent fuel to Italian and Mediterranean ports.

AN AUCTION SALE of a large amount of chemical and kindred plant lying at the Bradley Mill Works and adjoining factories in Huddersfield will be carried out by Fuller, Horsey, Sons, and Cassell, at the Griffin Hotel, Boar Lane, Leeds, on behalf of the George Cohen Disposal Corporation, on February 23 and following days.

SIR E. H. COOK, at a recent meeting of the Bristol and South-Western Section of the Institute of Chemistry, formally admitted the following Associates of the Institute :—Miss M. E. Keiser, B.Sc. (Bristol), Mr. H. C. Hillman, B.Sc. (Swindon), Mr. C. A. Scarlett (Dover), Mr. H. J. Willavoys, B.Sc. (Stroud), Mr. E. Winterbottom, B.Sc. (Launceston).

PROFESSOR J. W. COBB, speaking to the Leeds Area Section of the Institute of Chemistry on Tuesday, said there was probably no branch of chemistry which provided better opportunities than that of fuel. More economy in fuel utilisation, the demand for liquid fuel, motor spirit, and the awakening of the public conscience to the evil arising from smoke, made for the intervention of the scientifically trained fuel technologist. The fully qualified chemist was in great demand, his work was interesting, and his opportunities were likely to be greater.

ARTIFICIAL SILK PRODUCTION grows in importance in Canada. The following companies have plant for the production of artificial silk or important intermediates for it : Courtaulds, Ltd., at Ontario ; Canadian Celanese, Ltd. (capitalised at 7,000,000 dollars, plant being constructed at Drummondville, Quebec) ; Canadian Cellulose Co. (subsidiary to the Howard Smith Paper Mills), at Cornwall. In addition, the British Columbia Pulp and Paper Co. has been investigating the use of hemlock for the production of cellulose, and it is likely that a plant will be started for the purpose.

SUGAR-BEET news announced during the week was as follows :—The Central Sugar Co. of Peterborough, in its first year of working, has made a gross profit of £115,000 on a total capital of £350,000.—The annual luncheon of the British Sugar Beet Society will be held on Thursday, February 17, at the Hotel Victoria, Northumberland Avenue, London.—The erection of the sugar-beet factory at Inverness to serve an area from Morayshire northwards is under discussion.—A contract has been signed between the Lincolnshire Beet Sugar Co., Ltd., and Sir Robert McAlpine and Sons for the erection of a large sugar-beet factory at Bardney, in Lincolnshire. The factory, to have an initial capacity of 1,000 tons per day, and a final capacity of 1,400 tons, will be finished in time for the 1927 crop.—Colonel Walter Guinness, Minister of Agriculture, stated at a meeting of the Council of Agriculture for England that in 1927 there would be an increase of 40,000 acres in the area under sugar-beet. Fourteen factories had been operated in the present season.

SIR ALFRED MOND, M.P., will address the Newcastle Chamber of Commerce on Tuesday, February 15.

THE CENTENARY OF ALUMINIUM occurs this year, the element having been first prepared in 1827 by Friedrich Wöhler.

COMPANIES REGISTERED IN 1926 at Somerset House under the heading of "chemists" numbered 323, and the total capital involved was £67,657,392.

MR. H. C. HOGBIN, of Highlands, Osterley Park, Middlesex, a chemical manufacturer, has been selected as the Unionist candidate in the impending Stourbridge by-election.

MAJOR C. A. MANDER, of Wolverhampton, presided at the annual dinner of the Midland Varnish, Paint and Colour Manufacturers' Association at Birmingham on Friday, January 21.

KRUPPS'" Hermannshutte " smelting works have been purchased by the town of Neuwied. The works will be operated in order to provide work for the unemployed at present in receipt of relief.

THE RESEARCH STATION of the Safety in Mines Board, at Harper Hill, near Buxton, will be opened in the spring. Professor R. V. Wheeler, of Sheffield University, has been appointed Director of Experiments.

DISEASES OF OCCUPATION reported under the Factory and Workshop Act during December, 1926, included five cases of chrome ulceration in the dyeing and finishing industries. Fatal industrial accidents included one in the chemical industry.

UNITED STATES EXPORTS of chemicals during the first 9 months of 1926 amounted to $132,118,000, and imports to $161,496,000. Both figures were in excess of those for the corresponding period of 1925, the exports by 6 per cent., the imports by one-half per cent.

COLONEL SIR E. A. BROTHERTON, of Brotherton and Co., Ltd., has been gazetted as deputy lieutenant of the West Riding of Yorkshire and of the city and county of York. He has been in the past M.P. for Wakefield, mayor of Wakefield, and lord mayor of Leeds.

AT THE BRADFORD COUNTY COURT, on Tuesday, January 18, Judge McCleary granted an application for a new trial made by Winter Brothers and Co., Ltd., manufacturing chemists, of Great Horton, Bradford, the respondent being J. Nicholson, a shopkeeper, of Altwhistle, near Carlisle.

RECENT WILLS INCLUDE : Mr. Arthur Oldroyd (73), of Dewsbury, a former alderman, director of the Yorkshire Dyeware and Chemical Co., Ltd., £118,088.—Mr. John Wilson, J.P., (72), of Romford, Essex, formerly manager of Lawes Chemical Works, Barking (net personalty £10,360), £10,419.

DYEING OPERATIVES to the number of 100,000, embraced within a sliding scale incorporated in the wages agreement, will, for the first week in February, receive an increase in wages owing to the fact that when the last ascertainment was made (in October) the cost of living index figure stood at 74—*i.e.*, one point higher than on January 1 of this year.

PROFESSOR A. A. NOYES, of the California Institute of Technology, has been elected president of the American Association for the Advancement of Science, while Dr. Roger Adams, of the University of Illinois, has been elected chairman of the chemistry section. Dr. Adams has been awarded the Nichols Medal in chemistry of the New York Section of the American Chemical Society, for his work on the acids of chaulmoogra oil in the treatment of leprosy.

PROFESSOR A. V. HILL, of University College, London, Foulerton research professor of the Royal Society, will act as visiting lecturer in chemistry at Cornell University, U.S.A., for the period February to May. His visit is made in connection with a scheme whereby men of science from abroad are brought to work in Cornell, where they continue their researches and lecture upon them. The two previous lecturers under this scheme have been Professor Cohen, of Utrecht, and Professor Paneth, of Berlin.

THE INSTITUTE OF CHEMISTRY announces the following passes in the January examination for the Associateship in general chemistry : A. G. Avent, Merchant Venturers' Tech. College, Bristol ; E. H. Bunce, Birkbeck College ; F. W. Clulow, B.Sc. (Lond.), trained under G. E. Johnson, F.I.C., at the Municipal Tech. College, Hull, and Bradford Technical College ; L. Cocker, Huddersfield Technical College ; J. R. Hunecke, B.Sc. (Lond.), trained under G. E. Johnson, F.I.C., at the Municipal Tech. College, Hull ; E. Myer, Liverpool Central Tech. School ; A. E. Taylor, Birmingham Municipal Technical School.

THE BOARD OF TRADE announces that the standing committees to be set up under the Merchandise Marks (Imported Goods) Act will shortly be appointed. Applications for Orders in Council to require the marking of imported goods with an indication of origin may now be made, but in order to secure their reference to one or other of the committees for public inquiry it must be established that the applications substantially represent the interests of either manufacturers, producers, dealers, traders, users or consumers, or of any body of wage-earners. Applications for goods other than agricultural, horticultural or fishing industry produce should be addressed to the Secretary, Board of Trade, Great George Street, London, S.W.1.

DR. G. D. ROSENGARTEN has been elected president of the American Chemical Society.

PROFESSOR I. M. HEILBRON and Drs. Kamm and Morgan, of the University of Liverpool, are working on the isolation of the precursor of vitamin D, which has curative action in rickets, from cholesterol and other substances, in which it is present in traces.

DR. STANLEY SMITH will give a short practical course of lectures on the "Manufacture, Applications, and Uses of Nitro-Cellulose Lacquer" at the Borough Polytechnic Institute, Borough Road, London, S.E., commencing on Thursday, February 3.

THE I.G. COAL LIQUEFACTION PLANT which is being erected at Merseburg will consist of 23 buildings. In addition the Leunawerke are also constructing a new calcium nitrate plant. The total number of persons employed (personnel and building operatives) approaches 16,000.

SCOTTISH DYES, LTD., applied to Grangemouth Dean of Guild Court on Tuesday for warrant to make further large additions to their extensive premises in Earls Road, Grangemouth. A new chemical building is in the course of erection, and two similar ones are to be built. It is stated that Earls Road premises will cost £60,000.

THE DIRECTOR OF FUEL RESEARCH has reported on a test on the "Fusion" rotary retort for low temperature carbonisation, installed at the works of Electro-Bleach and By-Products, Ltd., Cledford, Cheshire. The report is published for the Department of Scientific and Industrial Research by H.M. Stationery Office, price 9d.

HART'S COLOURS, LTD., has been registered, having acquired the Crown Works at Darwen of H. W. Hart and Co., Ltd., colour manufacturers, and also the works of the Colloisil Colour Co., Ltd., at Bredbury. The business will be carried on at Crown Works, Darwen, and the Colour Works, Bredbury, Stockport, the latter being also the registered office. Mr. J. Morley Tiplady will act as managing director.

APPLICATIONS ARE INVITED for the post of Assistant Government Analyst in Nigeria—£600—£30—£720—£40—£920, plus free quarters. The Private Secretary (Appointments), Colonial Office, 38, Old Queen Street, London, S.W.1. March 1.—Lecturer and Demonstrator on Organic Chemistry in the University of Sydney, New South Wales. £350—£40—£700. The Agent-General for New South Wales, Australia House, Strand, London, W.C.2. February 28.

SIR MAX MUSPRATT, speaking at a meeting of industrialists in London on Wednesday, January 19, held in preparation for the World's Economic Conference, to be held in Geneva in May, said that industries which adopted international industrial ententes almost invariably reduced prices to customers, and gave better wages, conditions of employment and security to their workmen. He was convinced that international industrial ententes offered to many industries the best line of advance for the clearing up of existing difficulties, both social and industrial, and the advancement of civilisation.

UNDER THE FOOD AND DRUGS ACT, William Steel, dairyman, was charged before the Hamilton Sheriff Court on Monday, on the complaint of Dr. Hume Patterson, medical officer of the county, with supplying milk which was not genuine, through the hands of his wife on his premises. It was stated that the milk contained less than 3 per cent. milk fat, and in the course of the evidence the medical officer stated that an analysis proved that the milk was 5 per cent. deficient. The defence was that the milk was sold as it came from the cow. The Sheriff imposed a fine of £10, with the option of twenty days' imprisonment.

THE SALE OF MILK REGULATIONS were discussed by the Central Council of Milk Recording Societies at a meeting in London on Wednesday. It was urged that the regulations should be amended, and that no seller should be convicted on a charge of selling adulterated milk unless the prosecution proved that the milk was adulterated, and that the seller knew, or ought to have known, that it was adulterated. Mr. J. Mackintosh, the milk analyst at Reading University, said there were recurring cases where a producer of milk was prosecuted for selling milk below the required standard when he was quite free from blame.

THE ELECTRICAL AND CHEMICAL EBONITE CO., LTD., which has had plans prepared for a manufacturing unit to employ 500 people, held its second annual meeting, on Wednesday, in Northampton. This was followed by a lunch, at which directors, shareholders, and others interested in chemical and electrical research work were the guests of Mr. Arthur H. Johnson, the chairman of the company. During the afternoon there was a largely attended demonstration of the manufacturing process of Dr. M. Wilderman's patent separators and filters at the Osborne Works, Northampton, which are used for demonstration plant. It is anticipated that the unit will turn out 10,000,000 of Dr. Wilderman's separators a year. Among those present at the annual meeting, lunch, or demonstration were: Mr. A. H. Johnson, the Earl of Leven and Melville, the Hon. Lord Ashbrook, Sir Alexander Walker, Sir William Cope, and Dr. Ormandy.

NITRATE OF SODA has, it is stated in a message from Valparaiso, been sold in large quantity under the new scheme recently approved by the Producers' Association, under which up to 75 per cent. of the stock remaining unsold at June 30 is repurchased.

FOUR ADJOURNED SUMMONSES in respect of different dates against William Aykroyd and Sons, Ltd., of Oakwood Dyeworks, Bradford, for allowing grit to be emitted from their chimneys, were adjourned for three months at Bradford on Thursday, January 20.

PROFESSOR FREDERICK SODDY, F.R.S., the chemist and radiologist of Oxford University, delivered the terminal lecture to the students of the Welsh University College, Cardiff, last week-end. The subject of his address was "The Wrecking of a Scientific Age."

UNEMPLOYED INSURED PERSONS in the chemical industry in Great Britain and Northern Ireland at December 20, 1926, numbered 8,474, and those in the explosives industry 1,604. The number of insured persons in the chemical industry at July, 1926, was 94,530, the percentage unemployed at December 20 being 9·0.

THE GEOLOGICAL SOCIETY has this year made the following awards: Wallaston Medal, Professor W. W. Watts; Murchison Medal, Dr. G. T. Prior; Lyell Medal, Sir A. E. Kitson; Bisgby Medal, Mr. B. Smith; Wollaston Fund, Miss M. E. J. Chandler; Murchison Fund, Mr. S. H. Haughton; Lyell Fund, Mr. L. Hawkes and Miss E. Goodyear.

THE ENGAGEMENT is announced of Rudolph, son of Sir Max Muspratt, Bart., and Lady Muspratt, to Constance, second daughter of Mr. M. L. Davies and Mrs. Davies, of Toronto, Canada. Mr. Davies is president of the Standard Chemical Co., of Canada, and director of the North American Chemical Co., which is owned by the United Alkali Co., Ltd.

THE DYEING AND FINISHING sections of the textile trade of Yorkshire, Lancashire, Derbyshire, Cheshire, and part of Scotland are threatened with trouble as a result of the proposal of the Allied Association of Bleachers, Dyers, Printers, and Finishers to discontinue the payment of the Mackenzie Award of 2s. per week to men and 1s. 3d. per week to women.

C. TENNANT, SONS AND CO., the well-known London and Cardiff metal merchants, have, we understand, obtained an option to purchase about 40 acres of land adjacent to the spelter works in the Morriston area for the purpose of treating the spelter residue dumps in the neighbourhood. Boring operations are already being carried out on the dumps with a view to finding out whether treatment would prove remunerative.

MR. R. R. BUTLER, head of the department of chemistry in the Municipal Technical College, Plymouth, gave an address at the college on Friday, January 21, on "Chemistry and Politics." He said that British brains were as good as the corresponding brains on the Continent and in the United States, but that with regard to chemical research, England was still lacking in effective co-ordination. Unless this country fully developed its chemical technology it would not be able to take its right place in the League of Nations. If it did so, it would be in a position to save us and mankind from all future wars.

THE BAKELITE CORPORATION of New York has been notified that a new hearing of alleged violations of patents held by the corporation by New York importers, will be held by U.S. Tariff Commission on February 8. The importers at a hearing held by the Commission on December 28, protested against a ruling by the Treasury Department denying entry into this country of multi-coloured cigar and cigarette holders. The holders were declared to have been manufactured from synthetic phenolic resin, and to have violated certain patent rights of the Bakelite Corporation, who are complainants against the importers. The importers denied that the articles were manufactured according to a patent held by Bakelite Corporation.

Obituary

DR. O. SCHÖNHERR, discoverer of the Schönherr process of nitrogen fixation, in Dresden.

PROFESSOR H. TAPPEINER, formerly a well-known physiological chemist and pharmacologist, in Munich, aged 80.

MR. F. J. STOAKLEY, for many years chief assistant to the professor of chemistry, at Cambridge, on January 16, aged 62.

MR. J. RIGG, of Applegarth, Windermere, aged 81. He was actively concerned in several chemical companies at St. Helens.

EUGENE TURPIN, who had done a great deal of work on explosives, in Paris, aged 78. He was the inventor of melinite, among other explosives.

MR. H. RICHARDSON, on January 10. He retired in 1920, having then been associated for over 50 years with Joseph Richardson and Sons, of Northwich.

DR. A. HELFENSTEIN, in Vienna, aged 52. He had been concerned for many years in the construction of electric ovens, and in the electrothermal production of carbide, ferrosilicon, silicon, and iron.

MR. JOHN WEBSTER, F.I.C., official analyst to the Home Office, and chemical pathologist to St. Mary's Hospital, London, on Thursday, January 20, aged 49. A detailed account of his career appears on another page.

Progress of British Chemical Standards

A REPORT has just been published on the third of three years' working of the above movement. To render it more complete, epitomes of the first and second reports are embodied in it. During the period 47 fresh standards (standardised figures) were completed and issued. A further stage of the programme originally outlined has now been reached, and the range of carbon and alloy steels and cast-iron having been fairly well covered, a start has been made to meet the needs for other bodies, basic slag being followed by ores and non-ferrous alloys. The range and number of co-operators has been widened, the total number now being 74, of whom 17 represent France, India, Italy, Egypt, Spain, and the U.S.A., and 57 the British Isles. The number of users has considerably increased, viz., from 400 at the end of the second three-year period, to 700 in February, 1926, whilst the number of standardised figures has risen from 89 to 139. Of the 700 users, 125 are in Belgium, France, Holland, Poland, Spain, Switzerland, Egypt, South Africa, Australia, New Zealand, China, the Straits Settlements, Canada, the United States, Brazil, etc. Obviously all this tends to international co-ordination. Not only do the users include chemists of the types one would expect, such as those at iron and steel works, railways, motor and aero works, electrical and general engineering establishments, but also many in laboratories of widely differing types of business, *e.g.*, oil and paint, explosives, diamond mines, road material, gutta percha, asbestos, heat, lamps, telephones, etc. Their use, too, is becoming far more general, not only by public analysts and other independent chemists, but also by universities, colleges, technical schools, and other educational establishments, of which there are already 40 here and abroad who use them. These are encouraging features which both emphasise the growing appreciation of the utility and value of standards.

Bankruptcy of Importer and Refiner

THE public examination of Henry Albert Gibbs, of 9, John Street, Lozells, Birmingham, oil and chemical importer and refiner, was held on Wednesday, January 19, at the Court House, Birmingham. The statement of affairs showed a deficiency of £290 17s. 7d. Debtor attributed his failure to liabilities in respect of guarantees given on behalf of a limited company. He said that a company was formed in August, 1919, for the purpose of taking over a business, and he was appointed managing director. In June, 1922, the company was wound up by order of the court. In May, 1922, he promoted another company with a nominal capital of £1,500. He was allotted £400 in shares for services rendered and was appointed manager. In May, 1925, a fire occurred at the company's premises. The company was not insured. Recently debtor had been sued under guarantees and judgments were obtained against him. He stated that little business had been done since the fire, but prior to that the turnover was between £20 and £30 weekly. The examination was adjourned.

"L" and "N" Coal Distillation, Ltd.

THE following gentlemen are supporting Colonel J. T. C. Moore-Brabazon, M.P. (chairman and joint managing director), on the board of "L. and N." Coal Distillation, Ltd. :—Mr. P. C. Tennant (chairman and managing director Glico Petroleum Co., director Phœnix Oil and Transport); Colonel K. P. Vaughan-Morgan, O.B.E., M.P. (director and vice-chairman Morgan Crucible Co.); Mr. W. A. Woodeson (director Clarke, Chapman and Co., chairman Chesterfield Tube Co.); Mr. F. Middleton (joint managing director Old Silkstone Collieries, managing director Garforth Collieries); Mr. H. Ellison (Ellison and Mitchell, Don Chemical Works, director Yorkshire Iron and Coal Co.); and Mr. Bryan Laing, joint managing director, 100, Victoria Street, S.W. (managing director Sensible Heat Distillation).

Leave to Appeal Refused

THE Court of Criminal Appeal on Monday dismissed an application by William Miller Kneale, Liverpool, export agent, for leave to appeal against a sentence of nine months' imprisonment in the second division passed upon him at the Old Bailey for publishing a defamatory libel concerning Mr. Francis D'Arcy Cooper, chairman of Lever Brothers, Ltd.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

18 (*Sodium Cyanide*).—A firm in Budapest is anxious to be put in touch with manufacturers of sodium cyanide.

19 (*British Chemicals for U.S.A.*).—A firm in the United States, which is already conducting a prosperous business in the manufacture of highly technical chemicals, is in a position to handle additional lines because of having an extensive plant and an excellent organisation. They wish to make arrangements with English firms to manufacture chemical products here for marketing in the United States, the owners to receive benefit in the way of royalty or profit from the merchandise disposed of in America. In some cases, it may be necessary for the raw material or partially manufactured product to be sent from England. It is understood that this firm has a very complete and fully equipped laboratory with technical chemical experts fully qualified to handle a proposition of this kind.

20 ("*Endura*" *and* "*Beacon*").—"Could you ascertain the name and address of the owners of the trade marks (apparently not registered) "Endura" and "Beacon," appearing on certain articles pressed from urea-formaldehyde press powders, and on sale at London stores?"

Dermatitis Compensation Case

IN the Shoreditch County Court, on Tuesday, before Judge Cluer, there was an application under the Workmen's Compensation Act, brought by Henry Robert Wright, of 40, Norman Road, Old Ford, E., a labourer, for the judge to agree to a settlement of £100 compensation for dermatitis, the respondents being J. Manger and Son, Ltd., of 57, High Street, Kingsland, London, N.E., salt and soda manufacturers. On November 13, 1925, the applicant caught dermatitis during his occupation, working with caustic soda, with the result that for a long time he was unable to follow any occupation at all. He was certified as suffering from an industrial disease, and was paid his compensation. His wages had been £3 13s. 4d. per week. A few months back, £100 was offered in final settlement of his claim, but when the matter came before the Registrar, he refused to agree to the settlement, on the ground of inadequacy, and the matter came before Judge Cluer, who also declined to agree to it, and again on a second occasion, the same amount was offered, but Judge Cluer again refused to agree to the settlement. Mr. Rule (for the applicant) now asked for this settlement of £100 to be agreed to, on the ground that the man had fully recovered from the dermatitis, and his only disability was that he must not go back to work at the soda works, as working with caustic soda would be likely to cause a recurrence, but so far as he was otherwise concerned, he could follow any other occupation without any fear of again contracting dermatitis, or of it recurring. Judge Cluer pointed out that as the man could not get work at his old job, and there was no other work to-day, the same condition applied as had applied all along, for the amount of compensation offered was inadequate, considering the man's sufferings, and the fact that he had been prevented from following his ordinary occupation. The Registrar said the amount was not enough, and he saw no reason to disagree with him.

Heat Detecting Enamel

A VERY interesting showcard, which is intended to demonstrate the value of Melanoid heat detecting enamel, supplied by The Mond Tar By-products Syndicate, Ltd., of 47, Victoria Street, London, is being circulated. This enamel is of a red colour, but on being warmed the colour changes to dark brown, again reverting to the original red on cooling. The value of an enamel showing such reversible colour changes is obvious, and the substance is recommended by the makers as being of value for the detection of over-heated bearings and machinery at a distance.

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The action of phenylmagnesium bromide on trisubstituted acetonitriles. Ramart-Lucas and F. Salmon-Legagneur. *Comptes Rend.*, January 10, pp. 102–104.

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Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

263,201. Oxygenated Products from Hydrocarbons or Oxidisable Derivatives of Hydrocarbons, Manufacture and Production of. W. A. Caspari, 64, Queen's Gardens, London, W.C.2. Application date, November 11, 1925.

Hydrocarbons are oxidised by the aid of a catalyst of the oxide of a metal of the fifth, sixth or higher groups, such as vanadium, molybdenum, tungsten, chromium, or uranium. A colloidal solution of the catalyst in the liquid or molten hydrocarbon is prepared by means of a colloid mill or by passing an electric current at high voltage through electrodes of the catalyst immersed in the liquid. This solution is atomised, mixed with air, and heated to 200° to 400° C., and the product is then condensed. In an example, a colloidal solution of vanadium oxide in toluene is sprayed into air in the proportion by volume of toluene vapour 1 part, air 8 parts. The mixture is heated to 200° to 300° C., and benzaldehyde and benzoic acid are condensed and separated. Benzene may be similarly oxidised to maleic anhydride, and naphthalene to phthalic anhydride.

263,311. Camphene from Pinene Hydrochloride, Process for the Production of. H. Gammay, 207, Reinsburgstrasse, Stuttgart, Germany. Application date, January 7, 1926.

In the known process for producing camphene from pinene hydrochloride by the action of hydroxides or carbonates of the alkali or alkaline earth metals, phenol is employed as a reaction-promoting reagent, and the camphene produced contains phenol, even if the phenol employed is in the theoretical proportion. It is now found that camphene can be obtained free from chlorine and phenol if the latter is employed in only 20 per cent. of the theoretical amount, and under heat and pressure. In this case, the phenol acts as a contact agent and an excess of alkali is necessary, but this can be used again after the removal of the sodium chloride. The phenol can be replaced by other phenolic substances, such as naphthol or organic acids or their salts.

263,322. Residual Liquors from the Distillation of Fermented Liquids, Treating to Obtain Fertilisers and Glycerine. E. A. Barbet, 5, Rue de l'Echelle, Paris. Application date, January 30, 1926.

The residual liquor is concentrated until the boiling point reaches about 125° C., and is then suddenly subjected to a high vacuum. The vacuum is applied alternately with reheating of the residual liquor at normal pressure and at progressively increasing temperatures by means of a steam coil. Frothing of the residual liquor during the vacuum treatment is prevented by adding hydrocarbon oil which distils off with the glycerine and can be separated for use again. The glycerine is obtained at a high concentration, and a fertiliser containing nitrogen and potassium is also obtained.

263,340. Tartaric Salts, Process for the Extraction of. W. E. Klaversteijn, 1753, Patricias Mendocinas Street, Mendoza, Argentine. Application date, February 15, 1926.

The object is to extract the tartaric salts from wine lees and the like with economy in the use of fuel and chemical reagents. The dry raw material is ground to a coarse powder which is then roasted at about 150° C. The residues in this process may be employed as fuel. The material is then mixed with water or liquor from a previous operation in a closed vessel provided with an agitating device, and a current of sulphur dioxide is introduced until a pressure of 3 atmospheres is obtained. The potassium bi-tartrate is acted upon by the sulphur dioxide to produce potassium bisulphite and tartaric acid. Any calcium tartrate present is also converted into calcium bisulphite and tartaric acid. The pressure is then released, and the mixture filtered out of contact with air. The pressure on the solution is then reduced further, when the above reactions are reversed and sulphur dioxide is liberated. If the operation is stopped within about 2 per cent. of its completion, potassium bitartrate is again precipitated while calcium tartrate remains in the liquor. After repeated use of the liquor the accumulation of calcium tartrate may be treated with calcium bisulphite corresponding to the potassium salts still in the solution, so that all the tartaric acid is precipitated as calcium tartrate.

263,370. 1 : 4-Diarylamino-5 : 8-Dioxyanthraquinones, Process for the Manufacture of. W. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 13, 1926.

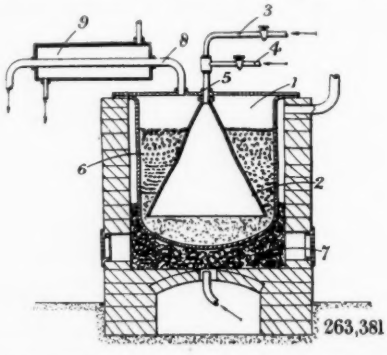
It is known that the hydroxyl groups in oxyanthraquinones or the leuco compounds can be replaced by aniline or its homologues, boric acid or hydrochloric acid being employed as condensing agent. If this is applied to the condensation of 1 : 4 : 5 : 8-leuco-tetra oxyanthraquinone, only a small yield is obtained, most of the mixture being resinified. It is now found that if arsenic acid is used as the oxidising agent, a quantitative yield of pure 1 : 4-diarylamino-5 : 8-dioxyanthraquinone is obtained, the reaction temperature being about 100° C., the condensation proceeding without any additional water.

263,376. Reduction of Aromatic Nitro Compounds. W. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 21, 1926.

When an aromatic nitro compound is reduced with iron and mineral acid, the iron is converted into a brownish-black oxide which has little or no value as a pigment. In this invention, the reduction with iron and a mineral acid is effected in the presence of an aluminium salt. The addition of such salt may render unnecessary any additional acid owing to the hydrolysis of the aluminium salt. Instead of an aluminium salt, metallic aluminium may be added, but aluminium chloride is preferably employed. When the nitro compound is reduced in this manner, the iron oxide is in a very fine state of division, as the yellow hydroxide of trivalent iron. The precipitate is washed and dried, and may be used as a pigment. A red pigment is produced by calcination. The pigment obtained is more yellow the larger the proportion of aluminium salt. The process is applicable to other nitro compounds such as chloro-, oxy-, amino-, and poly-nitro compounds, and nitrosulphonic acids.

263,381. Purification and Hydrogenation of Liquid Hydrocarbons, Process and Apparatus for. C. D. Maze, 17, Rue de Surène, Paris. Application date, April 27, 1926.

The process is for the desulphurisation and partial hydrogenation of hydrocarbons. Hydrocarbon is vaporised, mixed with twice the amount of steam and passed into finely-



divided metals capable of decomposing water at 350° to 450° C. The metals are regenerated *in situ* by increasing the proportion of steam. Suitable metals are iron, nickel, copper, cobalt, zinc, cadmium, with or without vanadium or tungsten up to 5 per cent.

The steam and hydrocarbons are supplied through pipes

3, 4 to a central conical bell 2, from which they pass into the finely-divided metal 6 which fills the retort 1. The retort is heated to about 400° C. by a fire 7, and the products are drawn off by a pipe 8 to a condenser 9. The metal is regenerated by varying the steam supply. Alternatively, the reaction mixture may be injected into a molten alloy of easily oxidisable metals such as tin, zinc, copper, antimony, bismuth, or aluminium.

International Specifications not yet Accepted

261,423. DYES. Society of Chemical Industry in Basle, Switzerland. International Convention date, November 14, 1925.

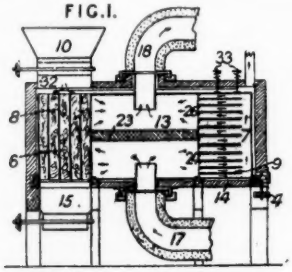
Indophenols having the general formula N (R^1R^2)—R^3—N=R^1=O, where R^1, R^2 represent hydrogen, alkyl, aryl, or aralkyl, R^3 an aromatic nucleus, and R^1 an aromatic nucleus with at least one halogen atom as nuclear substituent, are employed for dyeing cellulose esters blue-green shades. The indophenols are obtained by joint oxidation of a halogenised *p*-aminophenol and an aromatic amine with a free *p*-position.

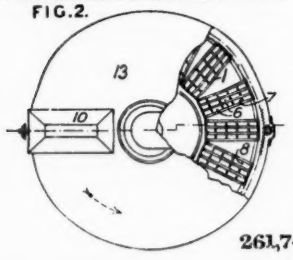
261,707. SPLITTING FATS, ETC. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. (Assignees of Farbwerke vorm. Meister, Lucius, und Brüning, Hoechst-on-Main, Germany.) International Convention date, November 20, 1925.

A sulphonated aromatic or hydro-aromatic mono- or polycyclic hydrocarbon, or a salt, containing a methyl or an ethyl group in the nucleus, which may also contain one or more alkyl, aryl, aralkyl, or alicyclic residues of high molecular weight is used for splitting fatty oils or fats. An example is given in which 1 per cent. causes an 82 per cent. splitting of linseed oil in nine hours.

261,740. DISTILLING SOLID MATERIALS. F. G. Hoffmann, Lugau-Neuoelsnitz, Erzgebirge, Germany. International Convention date, November 17, 1925.

Retorts 6 are arranged in radial units, and are separated by narrow heating spaces 7 and vertical partitions 8, so that the





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structure does not warp at high temperatures. The material is supplied through a hopper 10, and the whole structure is rotated by gearing 4, the solid products being discharged at 15. Heating gases are supplied through a conduit 17 and circulate in the heating spaces 7 as shown by the arrows to a compartment above the partition 23, and thence to the outlet 18. Discharge of the retorts is facilitated by vibration caused by strikers 33.

261,747. CYCLOHEXYLAMINES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. (Assignees of Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany.) International Convention date, November 17, 1925.

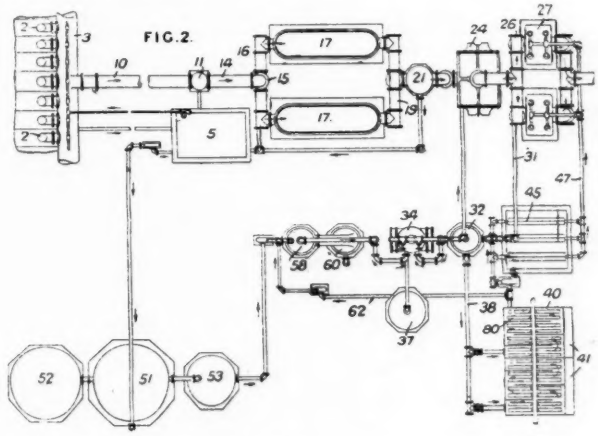
Cyclohexyl-arylamines are produced by the action of a halogen cyclohexane on a primary aromatic amine, and are then treated with alkylating agents to obtain tertiary amines containing a cyclohexyl group, an aryl group, and an alkyl group. Cyclohexyl-ethylaniline and cyclohexyl-methylaniline are obtained in this manner.

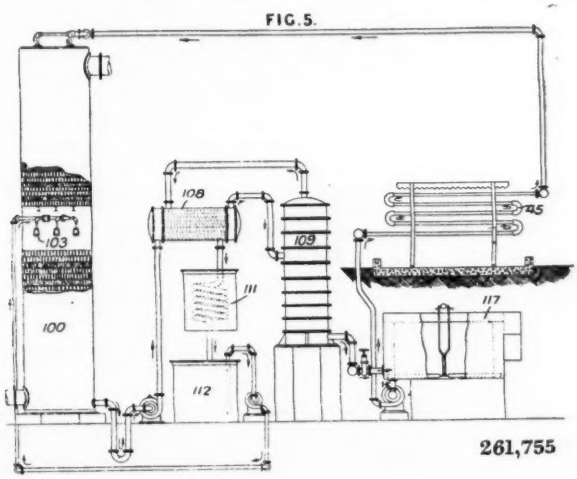
261,748. RUBBER SUBSTITUTES. Consortium für Elektrochemische Industrie Ges., 20, Zielstattstrasse, Munich, Germany. International Convention date, November 23, 1925.

A polymerised vinyl alcohol or a derivative or homologue such as an ether, ester, or acetal, is heated with sulphur or a sulphur compound, with or without a catalyst or vulcanisation accelerator to obtain rubber-like products.

261,755. PURIFYING GASES; AMMONIUM SULPHATE. Koppers Co., 800, Union Trust Building, Pittsburg, U.S.A. (Assignees of F. W. Sperr, 800, Union Trust Building, Pittsburg, U.S.A.) International Convention date, November 18, 1925.

Gases containing sulphuretted hydrogen from a battery of coke ovens pass from a collecting main 3 through pipes 10, 11, 14, 15, 16 to coolers 17 and thence to a tar extractor 21 and exhauster 24. The gases then pass to one or both ammonia washers 27, and tar and ammonia liquor pass to a tank 5 and thence to a tank 51 where they are separated into tanks 52, 53. The washers 27 may contain water or a suspension of hydrated ferric oxide, and the liquor passes





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through pipe 31 to a steam still 32 from which the ammonia passes to a condenser 34 and tank 37. The spent oxide passes from the still 32 to a regenerating apparatus 40. Sulphur collects in a trough 41. The regenerated liquor passes to a water cooled coil 45, and then by pipe 47 to the washers 27. Ammonia liquor passes from tank 53 to a free ammonia still 58, and fixed ammonia still 60. Ammonium thiosulphate and thiocyanate is drawn off by a pipe 62 to still 58. Manganese, cobalt, or nickel hydroxide may be used in place of hydrated ferric oxide.

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If the gas to be treated contains no ammonia, it is first washed in an absorber 100. A suspension of an iron compound is sprayed into the upper section, and ammonia liquor into the lower section. Hydrogen sulphide is absorbed in the lower section, and the liquor passes through a cooler 108 to a still 109, and regenerator 117. Concentrated ammonia passes from the still 109 through the cooler 108 and thence to condenser 111 and tank 112. The ammonia is then returned to the lower part of the absorber 100. The regenerated suspension passes through cooling coils 45 to the upper part of the absorber 100.

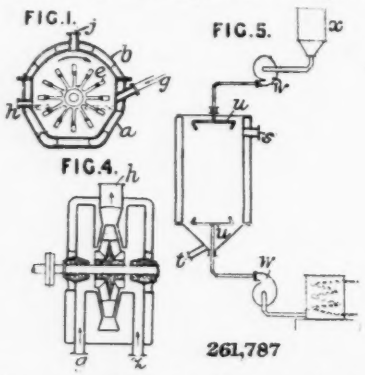
261,757. BENZANTHRONE DERIVATIVES AND DYES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. (Assignees of Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany.) International Convention date, November 17, 1925. Addition to 249,891. (See THE CHEMICAL AGE, Vol. XIV, p. 578.)

Halogen substitution products of benzanthronyl-mercaptans -sulphides, and -disulphides or their derivatives are condensed with a phenol, a mercaptan, or an alcohol, and the products are treated with alkaline condensing agents to obtain vat dyestuffs which give reddish-blue, or bluish-violet shades on cotton. Examples are given.

261,786-7. CHEMICAL AND PHYSICAL PROCESSES. J. Trautmann, 33, Halskestrasse, Berlin. International Convention date, November 21, 1925.

261,786. The reacting substances, *e.g.*, in the hydrogenation of coal and oil, and in the synthesis of oils from carbon monoxide and hydrogen, are heated by means of a finely divided heated metal.

261,787. Reacting substances such as those mentioned above, and metals or other catalysts, are brought into contact



by a threshing or centrifugal action. A closed chamber *a* having a heating jacket *b* contains rotating beaters *e*. The reacting substances are supplied at *g*, and the products are drawn off at *h* and *j*. In another apparatus resembling a blower, the reacting substances enter at *g*, molten metal at *z*, and the products are drawn off at *h*. In another apparatus, the reacting substances are supplied from a vessel *x* by a pump or blower *w* to the reaction chamber having atomisers *u* at top and bottom. Products are drawn off at *t* and *s*.

LATEST NOTIFICATIONS.

264,464. Process for the production of sodium sulphide. I. G. Farbenindustrie Akt.-Ges. January 18th, 1926.

264,466. Manufacture and production of condensation products of urea and formaldehyde. I. G. Farbenindustrie Akt.-Ges. January 12, 1926.

264,480. Process for the production of granulated dust-free nitrite of lime. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. January 14, 1926.

264,502. Manufacture and production of grey to black vat-dyestuffs. I. G. Farbenindustrie Akt.-Ges. January 12, 1926.

264,503. Manufacture and production of alkyl-pyrazolanthrones. I. G. Farbenindustrie Akt.-Ges. January 13, 1926.

264,508. Manufacture of new chloriodo compounds of alpha-aminopyridine and its derivatives. Chemische Fabrik auf Actien (vorm. E. Schering). January 15, 1926.

264,520. Manufacture and production of phosphorus and phosphorous oxides. I. G. Farbenindustrie Akt.-Ges. January 15, 1926.

264,530. Manufacture of carbazole quinones. I. G. Farbenindustrie Akt.-Ges. January 15, 1926.

264,535. Concentration and distillation of solutions of hydrogen peroxide. I. G. Farbenindustrie Akt.-Ges. January 18, 1926.

Specifications Accepted with Date of Application

244,130. Crude benzols, Continuous apparatus for the preliminary refining of. Soc. des Etablissements Barbet. December 5, 1924.

249,834. Alcohols from olefine-bearing gases, Preparation of. Petroleum Chemical Corporation. March 30, 1925.

263,886. Titanium compounds, Manufacture of. P. Spence and Sons, Ltd., A. Kirkham, and H. Spence. July 1, 1925.

263,898. Dyes, colouring matters, etc., Preparation of. B. Wylam, J. E. G. Harris, J. Thomas, and Scottish Dyestuffs, Ltd. August 5, 1925.

263,922. Carbon dioxide, Manufacture of. P. E. Haynes. October 3, 1925.

263,923. Heat treating metals and alloys, Apparatus for. W. S. Smith, H. J. Garnett, and J. A. Holden. October 3, 1925.

263,933. Carbonaceous substances, Distillation of. T. M. Davidson and Patent Retorts, Ltd., October 5, 1925.

263,938-9. Cellulosic materials, Treatment of—and the production of cellulose derivatives. H. Dreyfus. October 6, 1925.

264,050. Dehydrated alcohol, Method for the production of. E. A. Barbet. April 26, 1926. Addition to 224,921.

Applications for Patents

Adelantado, L. Manufacture of phosphate fertilisers. 1,419. January 17. (Spain, August 19, 1926.)

Benckiser, J. A. (Firm of), and Draisbach, F. Process for stabilising bleaching liquors. 1,871. January 21.

Brandwood, J. Apparatus for colour treatment of yarns. 1,910. January 22.

Carpmael, W., and I. G. Farbenindustrie Akt.-Ges. Manufacture of mordant disazo dyestuffs. 1,523. January 18.

Carpmael, W. Manufacture of white oil paints from lithopone, etc. 1,852. January 21.

Carpmael, W. Manufacture of indigoid dyestuffs. 1,853. January 21.

Dicker, S. G. S., and Rheinische Kampfer Fabrik Ges. Production of inactive menthol. 1,339 and 1,356. January 17.

Haddan, R., and Kohlenveredlung Akt.-Ges. Distillation of bituminous substances, fuels, etc. 1,742. January 20.

Haddan, R., and Stettiner Chamotte Fabrik Akt.-Ges. vorm. Didier. Ovens for chemical, etc., processes. 1,389. January 17.

Hadfield, J. Electrodeposition of metals. 1,922. January 22.

Hammond, C. F., and Shackleton. Concentrators, dehydrators, etc. 1,925. January 22.

Hands, H. J. Compositions containing cellulose esters, etc. 1,441. January 18.

Hercules Power Co. Manufacture of resins. 1,983. January 22.

Hoffmann-La Roche and Co. Akt.-Ges., F. Manufacture of a glucoside. 1,695. January 20. (Germany, February 13, 1926.)

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Denaturing agents. 1,365. January 17.

I. G. Farbenindustrie Akt.-Ges. Manufacture of mordant disazo dyestuffs. 1,523. January 18.

I. G. Farbenindustrie Akt.-Ges. and Imray O. Y. Manufacture of unsaturated aldehydes, etc. 1,611. January 19.

I. G. Farbenindustrie Akt.-Ges. Concentration and distillation of hydrogen peroxide solution. 1,363. January 17. (Germany, January 18, 1926.)

I. G. Farbenindustrie Akt.-Ges. Production of unsaturated hydrocarbons. 1,364. January 17. (Germany, January 19, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of keto alcohols. 1,399. January 17. (Germany, January 19, 1926.)

I. G. Farbenindustrie Akt.-Ges. Conversion of saturated hydrocarbons. 1,627. January 19. (Germany, January 20, 1926.)

I. G. Farbenindustrie Akt.-Ges. Converting insoluble substances into a state of aqueous solution, etc. 1,769. January 20. (Germany, January 20, 1926.)

Klien, R., and Montecatini Soc. Generale per l'Industria Mineraria et Agricola. Manufacture of sulphuric acid. 1,606. January 19. (Italy, January 19, 1926.)

Krebs, E. Apparatus for electrolysing solutions of alkali chlorides. 1,850. January 21. (Norway, January 23, 1926.)

Massie, D. M. Colouring cement, concrete, etc. 1,648. January 20.

Metallbank und Metallurgische Ges. Akt.-Ges. and Mond, A. L. Process of roasting fine sulphide ores, etc. 1,821. January 21.

Porter, W. H. Water-softening apparatus. 1,650. January 20.

Silica Gel Corporation. Refrigerating apparatus. 1,768. January 20. (United States, October 28, 1925.)

Soc. Chimique des Usines du Rhône. Process for treating acetic acid. 1,601. January 19. (France, February 26, 1926.)

Takayama, Y. Collecting potassium salt, etc., from waste liquor. 1,979. January 22.

Tardan, J. J. Manufacture of lead monoxide. 1,885. January 21. (France, January 30, 1926.)

Wilderman, M. Filter presses. 1,888. January 21.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £34 per ton; powder, £36 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 5d. to 2s. 10d. per gall.; pyridinised industrial, 2s. 7d. to 3s. per gall.; mineralised, 3s. 6d. to 3s. 10d. per gall.; 64 O.P., 1d. extra in all cases; prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6¼d. to 6½d. per lb. Crude 60's, 1s. 9¼d. to 1s. 10½d. per gall.

ACID CRESYLIC 99/100.—2s. 3d. to 2s. 4d. per gall. Steady. 97/99.—2s. to 2s. 1d. per gall. Pale, 95%, 1s. 10d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d. per gall.

ANTHRACENE.—A quality, 2½d. to 3d. per unit. 40%, 3d. per unit.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.; both according to gravity.

BENZOLE.—Crude 65's, 1s. 3½d. to 1s. 4½d. per gall., ex works in tank wagons. Standard Motor, 1s. 11½d. to 2s. 4½d. per gall., ex works in tank wagons. Pure, 2s. 2½d. to 2s. 5½d. per gall., ex works in tank wagons. Steady.

TOLUOLE.—90%, 2s. to 2s. 6d. per gall. Firm. Pure, 2s. 3d. to 2s. 8d. per gall.

XYLOL.—2s. 3d. to 2s. 8d. per gall. Pure, 4s. per gall.

CREOSOTE.—Cresylic, 20/24%, 10½d. per gall. Standard specification, 6¾d. to 9d.; middle oil, 7½d. to 8d. per gall. Heavy, 8¾d. to 9d. per gall.

NAPHTHA.—Crude, 10d. to 1s. 1d. per gall. according to quality. Solvent 90/160, 2s. to 2s. 1d. per gall. Solvent 95/160, 1s. 11d. to 2s. per gall. Solvent 90/190, 1s. 3½d. to 1s. 4d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £8 per ton. Whizzed or hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £11 10s. to £12 10s. per ton. Quiet. Flaked, £12 10s. per ton, according to districts.

PITCH.—Medium soft, 117s. 6d. to 130s. per ton, according to district. Prices nominal.

PYRIDINE.—90/140, 9s. 6d. to 17s. per gall. Nominal. 90/180, 7s. 6d. per gall. Heavy, 7s. to 10s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—8s. per lb.

ACID H.—3s. 3d. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—9½d. per lb. naked at works.

ANILINE SALTS.—9½d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—4d. to 4½d. per lb.

m-CRESOL 98/100%.—2s. 8¾d. per lb.

p-CRESOL 32/34° C.—2s. 8¾d. per lb.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—2s. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—11d. to 1s. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.

B-NAPHTHYLAMINE.—3s. per lb. d/d.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 9d. per lb. d/d.

NITROBENZENE.—7d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb. d/d.

R. SALT.—2s. 4d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—9d. per lb. naked at works.

p-TOLUIDINE.—2s. 2d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 per ton. Scarce. Grey, £17 5s. per ton. Liquor, 9d. per gall. 32° Tw.

CHARCOAL.—£8 5s. to £10 per ton and upwards, according to grade and locality. Very scarce and in fair demand.

IRON LIQUOR.—1s. 6d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.

RED LIQUOR.—10d. to 11d. per gall. 16° Tw.

WOOD CREOSOTE.—2s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 10d. to 4s. per gall., 60% O.P. Solvent, 4s. per gall., 40% O.P. Both scarce and in fair demand

WOOD TAR.—£4 to £5 per ton and upwards, according to grade.

BROWN SUGAR OF LEAD.—£41 to £42 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 5½d. per lb., according to quality, Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—2s. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£46 to £55 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—5s. 3d. per lb.

ZINC SULPHIDE.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.
ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 5d. per lb. Firm.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity.
ACID, BORIC B.P.—Crystal, £40 per ton; powder, £44 per ton. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 3½d. per lb., less 5%. Quiet.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.
ACID, SALICYLIC, B.P.—1s 4d. to 1s. 6d. per lb. Firm and good inquiry. Technical.—11¾d. to 1s. per lb.
ACID, TANNIC B.P.—2s. 9d. to 2s. 11d. per lb.
ACID, TARTARIC.—1s. 0½d. per lb., less 5%.
AMIDOL.—9s. 6d. per lb., d/d.
ACETANILIDE.—1s. 7d. to 1s. 8d. per lb. for quantities.
AMIDOPYRIN.—11s. 6d. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated: lump, 1s. per lb; powder, 1s. 3d. per lb.
ASPIRIN.—2s. 4d. per lb. Good demand.
ATROPINE SULPHATE.—11s. per oz. for English make.
BARBITONE.—8s. 9d. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—12s. 3d. to 14s. 3d. per lb.
BISMUTH CITRATE.—9s. 3d. to 11s. 3d. per lb.
BISMUTH SALICYLATE.—10s. to 12s. per lb.
BISMUTH SUBNITRATE.—10s. 6d. to 12s. 6d. per lb., all above bismuth salts, according to quantity.
BISMUTH NITRATE.—6s. 9d. per lb.
BISMUTH OXIDE.—13s. 9d. per lb.
BISMUTH SUBCHLORIDE.—11s. 9d. per lb.
BISMUTH SUBGALLATE.—9s. 9d. per lb.
BORAX B.P.—Crystal, £24 per ton; powder, £25 per ton. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Potassium, 1s. 10d. to 2s. per lb.; sodium, 2s 1d. to 2s. 3d. per lb.; ammonium, 2s. 3d. to 2s. 5d. per lb., all spot. Market firmer.
CALCIUM LACTATE.—1s 5d. to 1s. 6d.
CHLORAL HYDRATE.—3s. 3d. to 3s. 6d. per lb., duty paid.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHER METH.—1s. 1d. to 1s. 11½d. per lb., according to sp. gr. and quantity. Ether purif. (Aether B.P., 1914), 2s. 3d. to 2s. 4d., according to quantity.
FORMALDEHYDE.—£39 per ton, in barrels ex wharf.
GUAIACOL CARBONATE.—6s. 6d. to 7s. per lb.
HEXAMINE.—2s. 4d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 8d. per gallon f.o.r. makers' works, naked.
HYDROQUINONE.—4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE B.P.—2s. 1d. to 2s. 4d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 2d. to 2s. 5d. per lb.
IRON PERCHLORIDE.—22s. per cwt., 112 lb. lots.
MAGNESIUM CARBONATE.—Light Commercial, £33 per ton net.
MAGNESIUM OXIDE.—Light Commercial, £67 10s. per ton, less 2½%; Heavy Commercial, £22 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
MENTHOL.—A.B.R. recrystallised B.P., 18s. 9d. per lb. net; Synthetic, 12s. to 13s. per lb., according to quantity; Liquid (95%), 12s. per lb.; Detached Cryst., 15s. per lb.
MERCURIALS.—Red Oxide, 6s. 5d. to 6s. 7d. per lb., levig., 6s. to 6s. 1d. per lb.; Corrosive Sublimate, Lump, 4s. 3d. per lb., Powder, 4s. 2d. to 4s. 3d. per lb.; White Precipitate, 5s. 1d. per lb., Powder, 4s. 11d. to 5s. 1d. per lb., Extra Fine, 5s. 1d. to 5s. 2d. per lb.; Calomel, 5s. 3d. to 5s. 5d. per lb.; Yellow Oxide, 5s. 10d. to 5s. 11d. per lb.; Persulph., B.P.C., 5s. 1d. to 5s. 2d. per lb.; Sulph. nig., 4s. 10d. to 4s. 11d. per lb.
METHYL SALICYLATE.—1s. 9d. per lb.
METHYL SULPHONAL.—15s. 6d. per lb.
METOL.—11s. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. per lb.
PHENAZONE.—5s. 9d. to 6s. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—83s. per cwt., less 2½% for ton lots.
POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 6½d. per lb., spot.
QUININE SULPHATE.—2s. per oz., 1s. 8d. to 1s. 9d. per oz. in 100 oz. tins.
RESORCIN.—4s. to 4s. 3d. per lb., spot.
SACCHARIN.—55s. per lb.
SALOL.—3s. to 3s. 3d. per lb.
SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.
SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb. B.P.C., 1923—2s. to 2s. 1d. per lb. U.S.P., 1s. 11d. to 2s. 2d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb. carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—80s. to 85s. per cwt., according to quantity.
SODIUM SALICYLATE.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
SULPHONAL.—10s. 6d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. to 2s. 2d. per lb.
THYMOL.—Puriss., 12s. to 13s. per lb., according to quantity. Very firm; natural, 14s. 9d. per lb. Cheaper.

Perfumery Chemicals

ACETOPHENONE.—7s. 3d. per lb.
AUBEPINE (EX ANETHOL).—10s. 6d. per lb.
AMYL ACETATE.—2s. per lb.
AMYL BUTYRATE.—5s. 6d. per lb.
AMYL SALICYLATE.—3s. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—18s. per lb.
COUMARIN.—11s. per lb.
CITRONELLOL.—15s. per lb.
CITRAL.—9s. 6d. per lb.
ETHYL CINNAMATE.—10s. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—9s. 6d. per lb.
GERANIOL (PALMAROSA).—19s. per lb.
GERANIOL.—6s. 6d. to 10s. 6d. per lb.
HELIOTROPINE.—4s. 10d. per lb.
ISO EUGENOL.—13s. 6d. per lb.
LINALOL.—Ex Shui Oil, 12s. per lb. Ex Bois de Rose, 16s. per lb.
LINALYL ACETATE.—Ex Shui Oil, 14s. 6d. per lb. Ex Bois de Rose, 18s per lb.
METHYL ANTHRANILATE.—9s. per lb.
METHYL BENZOATE.—4s. 6d. per lb.
MUSK KETONE.—36s. per lb.
MUSK XYLOL.—8s. 6d. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—12s. per lb.
PHENYL ETHYL ALCOHOL.—11s. per lb.
RHODINOL.—28s. 6d. per lb.
SAFROL.—1s. 6d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN.—19s. per lb.

Essential Oils

ALMOND OIL.—11s. 6d. per lb.
ANISE OIL.—3s. 3d. per lb.
BERGAMOT OIL.—29s. per lb.
BOURBON GERANIUM OIL.—11s. 3d. per lb.
CAMPHOR OIL.—63s. 6d. per cwt.
CANANGA OIL, JAVA.—20s. per lb.
CINNAMON OIL, LEAF.—6d. per oz.
CASSIA OIL, 80/85%.—8s. 9d. per lb.
CITRONELLA OIL.—Java, 85/90%, 2s. 3d. per lb. Ceylon, pure, 1s 10d. per lb.
CLOVE OIL.—6s. per lb.
EUCALYPTUS OIL, 70/75%.—2s. per lb.
LAVENDER OIL.—Mont Blanc 38/40%, Esters, 19s. per lb.
LEMON OIL.—8s. 3d. per lb.
LEMONGRASS OIL.—4s. 6d. per lb.
ORANGE OIL, SWEET.—9s. 9d. per lb.
OTTO OF ROSE OIL.—Bulgarian, 70s. per oz. Anatolian, 30s. per oz.
PALMA ROSA OIL.—9s. 6d. per lb.
PEPPERMINT OIL.—Wayne County, 23s. 6d. per lb. Japanese, 9s. per lb.
PETITGRAIN OIL.—8s. 3d. per lb.
SANDALWOOD OIL.—Mysore, 26s. per lb. Australian, 17s. 3d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, January 27, 1927.

THE chemical trade during the past week has been somewhat quieter, and orders still continue to be in the main for small quantities, and for near delivery. Prices, however, still remain very firm, and if anything, with a general upward tendency. The export demand is only fair, and much of the business offering is at unacceptable limits.

General Chemicals

ACETONE is somewhat steadier, and the price may be taken at round about £63 per ton, according to quantity and position.

ACID ACETIC.—Continues in good demand with price unchanged.

ACID CITRIC is lifeless and the price is anything from 1s. 2d. to 1s. 2¼d. per lb.

ACID FORMIC is very firm, and price is round about £52 per ton, for 85%.

ACID LACTIC is in very steady demand, and is standing at £43 per ton, for 50% by weight, the pure and edible qualities have been advanced in price.

ACID TARTARIC is inclined to be more active, but price is still nominal at 11½d. per lb.

ALUMINA SULPHATE.—Continues in good demand, and price inclined to be firmer at £6 7s. 6d. per ton, for 17/18%.

AMMONIUM CHLORIDE is a shade firmer at £19 per ton.

BARIUM CHLORIDE has been somewhat more active and price is now quoted at from £9 10s. to £10 per ton, according to quantity and position.

COPPER SULPHATE.—Continues in moderate inquiry, and is quoted at £24 to £24 10s. per ton.

CREAM OF TARTAR is extremely firm and scarce at £84 to £86 per ton.

EPSOM SALTS.—Unchanged at £5 10s. per ton, with a firmer tendency.

FORMALDEHYDE.—Continues in fair request, and is inclined to be slightly steadier, at £42 to £42 10s. per ton.

LEAD ACETATE.—Very firm, and the white quality is quoted at £45 10s. and brown at £43 10s. per ton.

METHYL ACETONE is extremely firm and inclined to be higher at £60 to £61 per ton.

METHYL ALCOHOL.—Unchanged at £46 per ton.

POTASSIUM CHLORATE is extremely steady at 3½d. to 3⅞d. per lb.

POTASSIUM PERMANGANATE is somewhat quiet, but price is well maintained at 7½d. per lb., for early delivery.

POTASSIUM PRUSSIATE.—Continues scarce and firm at 7½d. per lb. Many of the works appear to be fully sold for near delivery.

SODIUM ACETATE is quietly steady at about £19 10s. to £20 per ton, with quite a fair demand.

SODIUM BICHROMATE.—Continues in good request at British makers' figures.

SODIUM HYPOSULPHITE is active, especially for photographic quality. Prices are well maintained at British maker's figures.

SODIUM NITRITE is unchanged at £19 10s. to £20 per ton.

SODIUM PRUSSIATE is firm at 4½d. per lb.

SODIUM SULPHIDE.—The Continental market has advanced, and most home trade business is now passing into domestic makers' hands at convention figures.

ZINC SULPHATE is inclined to be scarce and firm at about £14 10s. per ton.

Coal Tar Products

There is no great change to report in the market conditions, although the prices of one or two coal tar products are somewhat easier.

90's BENZOL is worth 1s. 9½d. per gallon, on rails, while the motor quality is quoted at 1s. 9d. per gallon.

PURE BENZOL is unchanged at 3s. per gallon.

CREOSOTE OIL is quoted at about 7d. to 7½d. per gallon, on rails, at works in the country, while the price in London is about 8½d. to 8⅞d. per gallon.

CRESYLIC ACID is unchanged, and is quoted at 2s. per gallon, on rails for the pale quality 97/99%, while the dark quality 95/97% is worth about 1s. 11d. per gallon.

SOLVENT NAPHTHA is fairly easy, and is quoted at about 1s. 6d. per gallon, on rails.

HEAVY NAPHTHA is worth about 1s. 3d. to 1s. 4d. per gallon, on rails.

NAPHTHALENES are unchanged, the 76/78 quality being worth about £8 10s. to £9 per ton, while the 74/76 quality is worth about £8 to £8 5s. per ton.

PITCH remains slow with prices slightly easier.

Latest Oil Prices

LONDON.—LINSEED OIL quiet at 2s. 6d. to 5s. decline. Spot, £32 10s., ex mill; January to August, £31 2s. 6d.; September to December, £31 15s. RAPE OIL steady. Crude extracted, £44 10s., naked, ex wharf; technical refined, £46 10s. COTTON OIL steady. Refined common edible, £38; Egyptian crude, £33 5s.; deodorised, £40. TURPENTINE quiet and 9d. per cwt. lower. American spot, 53s. 9d.; May to June, 55s.; and July to December, 53s. 3d.

HULL, January 26.—LINSEED OIL.—Naked, spot, £31 15s.; January to May-August, £31 12s. 6d. COTTON OIL.—Naked Bombay crude, £32 5s.; Egyptian crude, £33 10s.; edible, refined, £37 10s.; technical, £36 10s.; deodorised, £39. PALM KERNEL OIL.—Crushed naked, 5½ per cent., £39 10s. GROUNDNUT OIL.—Crushed-extracted, £42; deodorised, £46. SOYA OIL.—Extracted and crushed, £34; deodorised, £37 10s. RAPE OIL.—Crude-extracted, £44 10s.; refined, £46 10s. per ton, net cash terms, ex mill. CASTOR OIL and COD OIL unaltered.

Nitrogen Products

Export.—The market for export still continues quiet, with a slightly increased demand for Spain and the Far East. Japan has closed a fair tonnage during the last week, but quotations are apt to sag a little, and the value to-day is about £11 2s. 6d. to £11 5s. f.o.b. U.K. port in single bags.

Home.—The demand for the home trade still continues quite good, but indications point to a big demand for the present season. Prices remain unchanged.

Nitrate of Soda.—There is nothing new to report this week. It is fully expected that the whole of the 200,000 tons which has been offered by the Chilean producers will be completely taken up, and it is indicated that as soon as this lot is placed a further quantity is likely to be offered.

Calcium Cyanamide

BUSINESS during January has been well maintained. Increased quantities have apparently been taken for prompt delivery compared with last year. The February price is announced at £9 14s. per ton delivered in 4-ton lots, carriage paid to any railway station in Great Britain, representing the usual monthly advance of 2s. per ton.

Action by Lazote Co.

LAZOTE, INC., of Wilmington, Delaware, manufacturing synthetic ammonia at Belle, W. Virginia, U.S.A., by the Claude process, has brought suit in the Federal Court at Buffalo against the Niagara Ammonia Co. and the Ammonia Corporation, for infringement of three patents owned by Lazote, Inc. The Ammonia Corporation owns the American rights to the Casale process for making ammonia synthetically and the Niagara Ammonia Co., a subsidiary of the Ammonia Corporation, is operating a Casale ammonia process plant at Niagara Falls, N.Y. According to the bill of complaint filed by Lazote, Inc., the process and apparatus used in this plant infringe three patents covering features of the process invented by Claude for manufacturing synthetic ammonia at high pressures. The Casale process is reported to operate at a pressure of 9,000 to 12,000 lb. per square inch. The bill of complaint asks for a permanent injunction restraining the defendants from infringing, and also seeks an accounting for profits and damages due to infringement.

Peace in Chemical Industry

NEGOTIATIONS that have been proceeding for many months have ended in the restoration of a happy relationship in the heavy chemical industry centred in Northwich, Runcorn, and St. Helens. Some fourteen thousand men are affected. It is stated that the arrangement that has been come to places relations on the old footing. The Joint Industrial Council for the industry is re-established, and any future changes in conditions will be referred to that body before a dispute can develop. An important provision is made to do away with the sympathetic strike, for it is understood that the unions concerned have undertaken not to call a strike in the event of a dispute in any other trade. In the event of trouble within their own union, strike action must be preceded by the ordinary channels of mediation through the Joint Industrial Council, and after proper notice has been given.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, January 26, 1927.

THERE has been considerable improvement in the heavy chemical market during the past week, good inquiry being received both for home and export, quantities asked for being appreciable. Prices remain steady.

Industrial Chemicals

ACID ACETIC.—98/100%, £55 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 to £38 per ton; 80% technical, £37 to £38 per ton, c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flakes, £34 per ton; powder, £30 per ton, packed in bags carriage paid U.K. stations.

ACID CARBOLIC ICE CRYSTALS.—Inquiry moderate and price reduced to about 6½d. per lb., delivered or f.o.b. U.K. port.

ACID CITRIC B.P. CRYSTALS.—In little demand, spot material quoted 1s. 3d. per lb., less 5%, ex store. On offer from the Continent at about 1s. 2¾d. per lb., less 5% ex wharf.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. 9d. per carboy. Dearsenicated quality, 6s. 3d. per carboy, ex works.

ACID NITRIC, 80°.—Quoted £23 5s. per ton, ex station full truck loads.

ACID OXALIC, 98/100%.—In moderate demand and price unchanged at about 3¾d. per lb., ex store, spot delivery. Price 3½d. per lb., c.i.f. U.K. ports, prompt shipment from the Continent.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Unchanged at about 11¼d. per lb., less 5%, ex store. Spot delivery. Offered for early shipment at 11¼d. per lb., less 5% ex wharf.

ALUMINA SULPHATE, 17/18% IRON FREE.—Spot material on offer at about £6 per ton, ex store. Quoted £5 8s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent.

ALUM, POTASH.—Lump quality now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal powdered 5s. per ton less. Lump on spot quoted £9 2s. 6d. per ton, ex store. Crystal powdered, £8 10s. per ton, ex store.

AMMONIA, ANHYDROUS.—Now quoted 10d. per lb., ex store, containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powder, £39 per ton, packed in 5 cwt. casks delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £23 to £24 per ton, ex station. Continental material on offer at about £20 15s. per ton, c.i.f. U.K. ports. Fine white crystals of Continental manufacture quoted £18 15s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Still in limited supply. Offered for early delivery at £19 15s. per ton, ex wharf. Spot material quoted £20 per ton, ex store.

BARIUM CARBONATE, 98/100%.—White powdered quality quoted £6 15s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £8 per ton, c.i.f. U.K. ports, packed in bags. Casks 7s. 6d. per ton extra. Offered on spot at about £9 12s. 6d. per ton, ex store.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Contract price to consumers, £8 per ton, ex station, minimum 4 ton lots. Spot material, 10s. per ton extra. Continental now quoted £7 10s. per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £19 10s. per ton; crystals, £20 per ton; powder, £21 per ton, carriage paid U.K. ports.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental on offer at £3 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or at £4 12s. 6d. per ton, f.o.b. U.K. ports for export.

COPPER SULPHATE.—English material quoted £23 per ton, f.o.b. U.K. ports. Continental on offer at £21 10s. per ton, c.i.f. U.K. ports.

FORMALDEHYDE, 40%.—Quoted £38 10s. per ton, c.i.f. U.K. ports. Spot material available at about £40 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental now quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material now on offer at about £35 10s. per ton, ex store.

LEAD, WHITE.—Quoted £36 per ton, ex store.

LEAD ACETATE.—White crystals quoted £43 per ton, c.i.f. U.K. ports; crown about £40 10s. per ton, c.i.f. U.K. ports; white crystals offered on spot at about £44 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

POTASH, CAUSTIC, 88/92%.—Solid quality, £27 5s. per ton, minimum 15 ton lots, c.i.f. U.K. ports. Smaller quantities, 15s. per ton extra. Liquid quality, 50° Be, £14 per ton, c.i.f. U.K. ports, minimum 15 ton lots.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE.—96/98% quoted £25 5s. per ton, ex wharf, early delivery. Spot material on offer at £26 10s. per ton, ex store. 90/94% quality quoted £22 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 98/100%.—Quoted £24 10s. per ton, c.i.f. U.K. ports, for powdered quality crystals, £2 per ton extra.

POTASSIUM NITRATE (SALTPETRE).—Offers from the Continent rather cheaper. Now quoted £21 5s. per ton, c.i.f. U.K. ports. Spot material on offer at £23 5s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 6¾d. per lb., ex store, spot delivery. On offer for early shipment at 6½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—In good demand. Spot material quoted 3⅞d. per lb., ex store. Offered from the Continent at about 7¼d. per lb., ex wharf.

SODA CAUSTIC.—Powder, 98/99%, £19 7s. 6d. per ton; 76/77%, £15 10s. per ton; 70/72%, £14 10s. per ton, carriage paid station, minimum 4 ton lots on contract. Spot material, 10s. per ton extra.

SODIUM ACETATE.—English material quoted £22 10s. per ton, ex store. Continental on offer at about £19 per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¼d. per lb., delivered buyers' works.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powder or pea quality £1 7s. 6d. per ton more; alkali, 59%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum 4 ton lots. Continental quality offered at £8 per ton, ex wharf, prompt shipment packed in bags. Casks, 10s. per ton extra. Pea crystals, photographic quality, of British manufacture quoted £14 10s. per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted about £12 12s. 6d. per ton, ex store. Refined quality, 5s. per ton extra.

SODIUM NITRITE, 100%.—On offer at £21 per ton, ex store, spot delivery.

SODIUM PRUSSIATE YELLOW.—In good demand and price unchanged at 4⅜d. per lb., ex store, spot delivery. Offered for prompt shipment at 4¼d. per lb., ex wharf.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 7s. 6d. per ton, ex works.

SODIUM SULPHIDE.—60/65%, solid, £12 10s. per ton; broken, £13 10s. per ton; flake, £14 10s. per ton; crystals, 31/34%, £8 10s. per ton, and £9 per ton, according to quality, delivered buyers' works, minimum 4 ton lots on contract. Price for spot, 5s. per ton, extra for solid, 2s. 6d. per ton, extra for crystals; 60/62%, solid quality offered from the Continent at about £9 7s. 6d. per ton, c.i.f. U.K. ports; broken, 15s. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £11 10s. per ton; rock, £11 10s. per ton; floristella, £11 per ton; ground American, £9 15s. per ton, ex store, prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b., U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered, 20s. per ton extra.

ZINC SULPHATE.—Continental material on offer at about £10 10s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates

CLEVES ACID.—2s. 3d. per lb., per 100%. Some home inquiries.

NAPHTHIONIC ACID.—1s. 4d. per lb., per 100%. Some home inquiries.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb., some home inquiries.

BENZOIC ACID.—1s. 8½d. per lb. Some home inquiries.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, January 27, 1927.

There is still an easy tendency to be observed in the case of several products on the Manchester chemical market, but, nevertheless, the general tone continues to be quite steady. Although the actual demand for heavy chemicals during the past week has only been of moderate extent, there has been rather an improved inquiry from home industrial users, more especially for forward delivery, and this is regarded as an encouraging sign. The demand for shipment is on quiet lines.

Heavy Chemicals

For phosphate of soda values remain comparatively steady at about £12 15s. per ton, although there is not much business passing in this at the moment. Prussiate of soda is called for pretty freely, and as offers are not too plentiful prices keep firm at 4¾d. per lb. Bichromate of soda is maintained at about 3¾d. per lb. and a fair trade is being done. Glauber salts are rather slow, but quotations are unaltered at £3 10s. to £3 15s. per ton. Hyposulphite of soda is only in small request at £10 per ton for commercial quality and £15 5s. for photographic. Saltcake keeps steady and in moderate demand at round £3 10s. per ton. For caustic soda inquiry keeps up at its recent level, and prices are firm at from £14 10s. to £16 10s. per ton. Sulphide of soda is rather dearer at £11 to £11 5s. per ton for 60–65 per cent. concentrated and £8 5s. for commercial material, although only a quiet business has been reported this week. Chlorate of soda is slow at about 3d. per lb. Bicarbonate of soda is steady and meets with a fair amount of inquiry at £10 10s. per ton. Bleaching powder is still being offered at £8 per ton with business on quietly steady lines. Nitrite of soda is in moderate demand at £19 5s. to £19 10s. per ton, whilst alkali moves off in fair quantities at firm prices, round £6 15s. per ton still being asked.

For yellow prussiate of potash there is still some inquiry at about 7¼d. per lb. Caustic potash meets with a quiet but steady demand, and prices remain at about £29 per ton. Carbonate of potash, also, continues to attract attention from buyers and values are firm at £26 5s. per ton. There is not much call for chlorate of potash, however, prices here having an easy tendency with round 3¼d. per lb. now being quoted. Permanganate of potash is slow and weak at 4⅞d. per lb. for the commercial quality and 6d. to 6⅛d. for the B.P. material. The demand for bichromate of potash remains fairly good, and at about 4¼d. per lb. prices show little material alteration from those last reported here.

There is only a slow inquiry for lead acetate, which is now on offer at from £16 10s. to £16 15s. per ton for grey and about £9 for brown. Lead compounds are displaying a certain amount of easiness and the demand this week has been rather quiet; white acetate is quoted at £44 10s. and brown at about £41, with nitrate of lead in the neighbourhood of £40 per ton. Sulphate of copper is on offer at slightly lower prices, with f.o.b. values at £24 to £24 5s. per ton. Although there is only a quiet demand for arsenic, quotations keep firm on relative scarcity at £17 per ton at the mines for white powdered Cornish makes.

Acids and Tar Products

The demand for citric acid is inactive and at 1s. 2¾d. to 1s. 3d. per lb. values in this section are easier than they were. Tartaric acid is also in limited request at 11¼d. per lb. Oxalic acid, however, keeps very firm at 3⅞d. to 4d. per lb., offers of this material still being on the short side. There is a fair selling movement in the case of acetic acid at steady prices, 80 per cent. commercial being quoted at £37 10s. per ton and glacial quality at £66.

Export prices for pitch this week are hovering round £5 15s. per ton, f.o.b., but buyers are not venturing very far. Carbolic acid crystals are quiet and easier at 0¾d. per lb., and solvent naphtha is in a somewhat similar position, current values for this being about 1s. 8¼d. per gallon. Creosote oil is quoted at round 8d. per gallon, and there is not much actual business passing in this at the moment.

Death of Mr. John Webster

We regret to announce the death of Mr. John Webster, senior official analyst to the Home Office, which occurred on Thursday, January 20. Mr. Webster, who was 49 years of age, was a member of an old Quaker family of Birmingham, and was educated at Mason's College. He was a Fellow of the Institute of Chemistry, of the Chemical Society, and of the Royal Society of Medicine. He was a member of the Society of Public Analysts (and had been on the council), of the Medico-Legal Society and of its council, and was also a member of the Biochemical Society. About 1900 he became assistant analyst to Sir Thomas Stevenson, senior scientific analyst to the Home Office, and they remained in association until the latter's death in 1908. Sir William Willcox succeeded Sir Thomas, and when Sir William retired in 1919 Mr. Webster was appointed. During the past twenty years Mr. Webster had been on the staff of the Pathological Chemistry Department of St. Mary's Hospital, London, and had held the position there of pathological chemist. He published several original papers, especially with reference to arsenical poisoning and the toxicology of salvarsan. His evidence took an important part in most of the poisoning trials of the last few years. He leaves a widow and one son.

The Chemistry of Cancer

At a meeting of the Liverpool Section of the Society of Chemical Industry, on Friday, January 21, Professor W. C. McC. Lewis gave a lecture on "Some Physico-Chemical and Biochemical Aspects of Malignant Neoplasms." The work described formed part of the chemical programme undertaken in connection with Professor Blair Bell's lead method of cancer treatment. The lecturer emphasised the fact that the chemical aspect necessarily dealt only with a particular phase of the general problem of malignant growth. That the chemical side was, however, of fundamental importance was evident when it was recalled that the pathological, histological and clinical observations were manifestations of modification in structure and metabolism which were themselves a consequence of chemical change. As regards the lead method initiated by Blair Bell, all that could be said at present was that the colloidal lead after injection was rapidly converted into lead phosphate in the blood and lodged itself apparently preferentially in the tumour. It had been found that lead somewhat accelerated glucolysis and retarded oxidation.

Possible Increase in German Potash Prices

The National Potash Council of Germany has decided to raise potash prices by an average of 9½ per cent. No reasons have been officially assigned for this decision, which was voted unanimously, but with representatives of the workers abstaining from voting. It is understood that the higher prices were based on increased cost of production due to a recent 3 to 4 per cent. advance in wages; also to heavier interest charges on the industry's foreign debts, notably its English loan. The National Council last summer tried to put through a price increase of 12 per cent., but this was promptly vetoed by the German Minister of Commerce. Whether he will approve of the present move is not known. In business circles it is hoped he will do so, since the proposed prices are so arranged as to burden German consumers of fertilisers far less heavily than foreign purchasers.

Faraday Society Meeting

At a meeting of the Faraday Society in London on Wednesday a number of papers were read and discussed. Mr. G. A. Elliott, Mr. S. S. Joshi, and Dr. R. W. Lunt read a paper "On the Velocity of Chemical Reaction in the Silent Electric Discharge," and Mr. G. A. Elliott a further paper on "The Activation of Hydrogen in the Electric Discharge." Mr. A. I. Downes and Dr. E. P. Perman described "An Improved Method of Measuring Vapour Pressure by Air Bubbling," and it was stated that the apparatus gave a high order of accuracy over a considerable range of temperatures. In "The Soret Effect, Part 1," Mr. C. C. Tanner described an optical method of measuring the effect, and its application to the measurement of the effect in fairly concentrated solutions of electrolytes.

Company News

CONSETT SPANISH ORE.—An interim dividend of 7½ per cent. is payable on February 14.

STAVELEY COAL AND IRON CO.—It is announced that an interim dividend of 6 per cent. is payable on the fully paid shares, and 4½d. on the 15s. paid shares, free of tax.

GAS LIGHT AND COKE CO., LTD.—The dividend for the half-year to December 31 last on the ordinary stock is at the rate of £5 per cent. per annum, and £64,646 is carried forward.

ENGLISH CHINA CLAYS, LTD.—The directors announce the payment of a dividend on the cumulative preference shares at the rate of 7 per cent. per annum for the half-year ended December 31 last, to be paid on February 1.

ENGLISH VELVET AND CORD DYERS' ASSOCIATION, LTD.—For the year ended December 31 last, a final dividend of 2 per cent. is recommended on the ordinary shares, making with the interim of 2 per cent. a total of 4 per cent.

Tariff Changes

FRANCE.—The French *Journal Officiel* for December 19 contains the French Budget Law for 1927, also dated December 19. Among the provisions of this law which are of more particular interest are the following :—The turnover taxes on nitrates of soda and lime, cyanamide, sulphate of ammonia, potassium salts K_2O, dephosphorisation slag, superphosphates and oilcakes (3½ per cent.) are maintained at their present level until December 31, 1927.—Arrangements with the Belgium-Luxemburg Economic Union for the total or partial exemption of certain goods from the first general increase of French Customs duties, resulting from the law of April 6, 1926, include chemical cellulose pulp, wet (ex Tariff No. 168). Similar arrangements with Italy include pure olive oil for soap making (ex Tariff No. 110) ; volatile or essential oils of lemon, bergamot, orange and mandarin orange (ex Tariff No. 112) ; tartaric acid (Tariff No. 0215) ; crystallised citric acid (ex Tariff No. 0230). These arrangements do not come into force until after exchange of ratifications.

GUADELOUPE (FRENCH WEST INDIES).—The *Journal Officiel* (Paris) for December 28 contains a Decree dated December 23, which replaces the existing specific duties on the export of vanilla and vanillin from Guadeloupe by the following scale of *ad valorem* rates : when the price of the product is up to 100 frs. per kilog the rate is 3 per cent. *ad valorem* ; more than 100 up to 200 frs. per kilog, 4 per cent. *ad valorem* ; more than 200 frs. per kilog, 5 per cent. *ad valorem*.

POLAND.—The Commercial Secretary to H.M. Legation at Warsaw reports that nitrate of calcium (Tariff No. 103 (3)) has been freed from import duty for three months as from December 29, 1926, by an order dated December 26.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

FIRECLAY.—A Canadian firm at Winnipeg have asked for samples and prices of fireclay from United Kingdom firms in a position to ship competitively to Canada. (Reference No. B.X. 3180.)

FIRECLAY.—A Canadian firm are desirous of receiving quotations and samples from United Kingdom producers of fireclay. (Reference No. B.X 3168.)

NON-FERROUS METALS.—A firm of import merchants established in Warsaw desires to obtain the representation for Poland of British producers of tin, nickel, copper and mercury. (Reference No. 91.)

Chemical Traders and Merchandise Marks

A USEFUL memorandum on the Merchandise Marks Act, 1926, has been prepared by the British Chemical and Dyestuffs Traders' Association. The main effects of the provisions are clearly set out, and points of special interest to chemical traders are emphasised.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to February 19, 1927.

"PARCOLAC."

473,366. For preparations for preventing rust on metal. Class 1. Parker Rust Proof Company (a Corporation organised and existing under the laws of the State of Michigan, U.S.A.), 2,177, East Milwaukee Avenue, Detroit, County of Wayne, State of Michigan, U.S.A. ; manufacturers. September 25, 1926. (To be Associated. Sect. 24.)

"ALPHA-LAC."

474,582. For paints, varnishes, enamels, dry colours, distempers, japans, lacquers, and anti-corrosive oils. Class 1. Colthurst and Harding, Ltd., 11, Queen Victoria Street, London, E.C.4. ; Alpha Works, Wharf Road, Cubitt Town, London, E.14 ; Phoenix Wharf, Bath Road, Bristol ; and Phoenix Colour Works, Temple Gate, Portwall Lane, Bristol ; white lead, paint, colour and varnish manufacturers. November 5, 1926. (To be Associated. Sect. 21.)

"ESESCOLIM."

475,187. Class 1. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Storry Smithson and Co., Ltd., Bankside Works, Bankside, Sculcoates, Hull ; paint and colour manufacturers. November 23, 1926.

"PROTECORATION."

475,484. Bituminous preparations and compositions in the nature of paints, and bituminous paints. Class 1. The Graphite Oils Co., Ltd., Victoria Street, Grimsby, Lincolnshire ; manufacturers. December 3, 1926.

"ZELOSO."

475,595. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Class 1. Goodlass Wall and Co., Ltd., 42 and 44, Seed Street, Liverpool ; manufacturers. December 6, 1926.

"FRIDAY."

475,612. Class 1. Paints, varnishes, enamels, japans, anti-corrosives and anti-fouling paints and compositions. Class 1. Heatproof Black Co., Ltd., 16, New Street, Leicester ; manufacturers. December 7, 1926.

"EVERSEAL."

473,228. Class 2. A preparation in powder or liquid form for protecting plant life against insects or other pests. Class 2. Everseal Products, Ltd., Newton Works, Goldsmith Street, London, W.C.2 ; manufacturers and distributors. September 21, 1926.

"ELEPHANT BRAND."

474,989. Bark and bark extracts. Class 4. The Natal Tanning Extract Co., Ltd. (a Joint Stock Company organised under the laws of the Union of South Africa), 24, Timber Street, Pietermaritzburg, Natal, South Africa ; and 149, Leadenhall Street, London, E.C.3 ; manufacturers. November 17, 1926. (To be Associated. Sect. 24.)

Opposition to the Registration of the following Trade Marks can be lodged up to February 26, 1927.

"SEXATONES."

473,562. Chemical substances prepared for use in medicine and pharmacy. Class 3. Evans, Sons, Lescher and Webb, Ltd., 56, Hanover Street, Liverpool ; wholesale druggists. October 4, 1926.

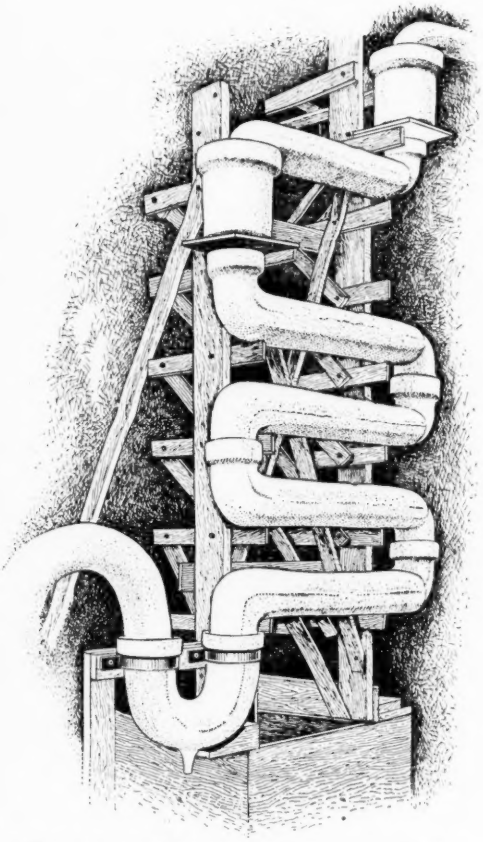
"TARZAN."

475,938. Raw or partly prepared vegetable, animal, and mineral substances used in manufactures. Class 4. Eccles and Co., 69, Wraby Street, Brigg, Lincolnshire ; manufacturers and factors. December 15, 1926. (To be Associated. Sect. 24.)

"STERNOLAC."

474,809. Chemical substances used in manufactures. Photography or philosophical research and anti-corrosives. Class 1. Sterns, Ltd., 16, Finsbury Square, London, E.C.2 ; oil refiners, grease, and lubricator manufacturers. November 12, 1926. (To be Associated. Sect. 24.)

The "VITREOSIL"



COLUMN OF "VITREOSIL" ABSORPTION VESSELS.

System of
HYDROCHLORIC ACID ABSORPTION

THESE VESSELS set up Vertically one above the other can be thoroughly Water Cooled.

Economies of Floor Space and Efficiency of Operation are secured. There are no submerged joints.

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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette, &c.

Winding Up Petition

H. F. FARNAN AND CO., LTD. (W.U.P., 29/1/27.) A creditors' petition for winding-up has been presented by The Pilot Trading Co., Ltd., 1-2, Great Winchester Street, London, oil and wax merchants, and is to be heard at the Royal Courts of Justice, on Tuesday, February 1.

Companies Winding Up Voluntarily

GENT (F. A.) AND CO., LTD. (C.W.U.V., 29/1/27.) E. Williams, Knutsford Road, Alderley Edge, Incorporated Accountant, appointed liquidator, January 18. Meeting of creditors No. 2 Committee Room, Houldsworth Hall, Deansgate, Manchester, on Monday, February 7, at 2.30 p.m.

GRIFFITHS FORMOY AND CO., LTD. (C.W.U.V., 29/1/27.) G. Hay, C.A., of the firm of Trenchard, Hay and Co., appointed liquidator, January 6.

UNITED ROUMANIAN OILFIELDS, LTD. (C.W.U.V., 29/1/27.) A. J. Hall, 76, Finsbury Pavement, London, appointed liquidator, January 12. Meeting of creditors at the offices of the company on Monday, January 31, at 12 noon.

Bankruptcy Information

SAWYER, Ernest George, 110, Fenchurch Street, London E.C., lately at Orchard Street, Pendleton, near Manchester, dye and chemical merchant. (R.O., 29/1/27.) Receiving order, January 19. Debtor's petition. First meeting, January 31, 11.30 a.m., and public examination, March 15, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an*—followed by the date of the Summary, but such total may have been reduced.*]

CLAY AND ABRAHAM, LTD., Liverpool, chemists. (M., 29/1/27.) Registered January 13, £6,500 mortgage (ranking in priority to debentures dated June 28, 1921), to Life Association of Scotland, 82, Princes Street, Edinburgh; charged on 18 and 16, Lord Street, Liverpool. *£12,314. July 1, 1926.

HILLABYS, LTD., Pontefract, liquorice refiners. (M., 29/1/27.) Registered January 12, debenture to Bank; general charge. *Nil. May 28, 1926.

LUCE'S EAU-DE-COLOGNE CO., LTD., Southampton. (M., 29/1/27.) Registered January 8, £700 mortgage to J. W. Du Pre, 42, King Street, Jersey, perfume manufacturer; charged on 34, Burlington Road, The Polygon, Southampton. *Nil. September 8, 1925.

Satisfaction

CLAY AND ABRAHAM, LTD., Liverpool, chemists. (M.S., 29/1/27.) Satisfaction registered January 13, £7,000, registered June 29, 1921.

Receivership

WARNEFORD (H. B.) AND CO., LTD. (R., 29/1/27.) J. H. Warneford Bell, of 4, Rushton Road, Cobridge, Burlsem, Stoke-on-Trent, was appointed receiver and manager on January 8, 1927, under powers contained in debentures dated July 5, 1926.

New Companies Registered

THE CALORIZING CORPORATION OF GREAT BRITAIN, LTD., Carlton House, Regent Street, London, W. Registered as a "private" company on January 24. Nom. capital, £10,000 in £1 shares. To adopt an agreement with the Scarab Oil Burning Co., Ltd., to develop and turn to account the calorising business carried on by them, to carry on the business of manufacturers of and dealers in metals, minerals, gas, chemicals, and oils; chemists, metallurgists, etc. Directors: Sir Henry White-Smith, Col. F. R. Macdonald, and W. Johnson.

HILLS (LLEWELLYN), LTD. Registered as a "private" company on January 22. Nom. capital, £50,000 in £1 shares. To adopt an agreement between the Hills Plymouth Co., Ltd., of the first part, B. E. Brown of the second part, and Lord Buckland of Bwlch (acting for himself and on behalf of the company) of the third part, and to carry on the business of colliery proprietors, miners, etc.; manufacturers of and dealers in coal, coke, patent fuel, lime, lime and other stone, chemicals and manures, distillers, dye makers, etc. Directors: Rt. Hon. Lord Buckland of Bwlch and W. M. Llewellyn. Solicitors: Gwilym James, Llewellyn and Co., 26, Victoria Street, Merthyr Tydvil.

NATIONAL TITANIUM PIGMENTS, LTD. Registered January 25, 1927. Nom. capital, £1,000 in £1 shares. Manufacturers, importers and exporters of and dealers in pigments, colours, fillers, zinc oxide, lithopone antimony oxides, titanium oxides, titanium white and compounds, etc. Solicitors: J. E. M. Crowther, 23, Abingdon Street, Westminster, London.

THOROLD'S PURE LIME AND HYDRATE CO., LTD., Ogbourne St. George, Marlborough, Wilts. Registered as a "private" company on January 20. Nom. capital, £40,000 in £1 shares (5,000 preference and 35,000 ordinary). To acquire the business of the Ogbourne Pure Lime Works, now carried on by J. E. Thorold at Ogbourne St. George, Marlborough, and to carry on the business of manufacturers, importers and exporters of and dealers in lime and hydrate of lime, nitrates, iodines, sulphates and phosphates of lime, fertilisers and manures of all kinds, etc. Directors: J. E. Thorold, Col. G. R. Codrington, Capt. Hubert E. P. D. Acland.

WELSALL VARNISH CO., LTD., 20, Wormwood Street, London, E.C.2. Registered January 12. Nom. capital, £200 in £1 shares. Manufacturers of varnish, sulphate of ammonia, tar distillers, dealers in and refiners and manufacturers of camphor and all kinds of drugs, and chemicals which may be required or used in connection therewith, etc., and to adopt an agreement with Salamon and Co., Ltd. Directors: J. R. Wells, J. R. Wells, jun., A. Wells.

WOTTON BROS., LTD., Milk Street, Bath. Registered as a "public" company on January 19. Nom. capital, £80,000 in £1 shares (40,000 7½ per cent. preference and 40,000 ordinary). To acquire the business of haulage contractors, quarry owners, etc., carried on by Frederick and William John Wotton as Wotton Bros., at Wick, Glos.; Milk Street, Bath; and Unity Street, Bristol, and to carry on the same and the business of manufacturers of and dealers in liquid compounds, chemicals, concrete, stone, etc. Directors: A. W. Wills, F. M. Fry, D. R. Hatt, F. Wotton, and W. J. Wotton.

Benn Brothers' Other Journals

THE CABINET MAKER.—Special London Number; Retailers' Windows; Preliminary Review of the London Exhibition; The Growth of the Present Extent of the London Furniture Trade; Woodworking Machinery and Practice.

DISCOVERY.—Problems of Research on Adhesives; "The Courtship of Spiders," by Theodore H. Savory; Cathode Rays: A New American Tube, invented by Dr. W. D. Coolidge; "The Physical and Optical Societies' Exhibition," by T. Barton Kelly; "The Total Eclipse of the Sun in July," by W. J. S. Lockyer, M.A., Ph.D., F.R.A.S.

THE ELECTRICIAN.—"33,000 V. Cables with Metal-Sheathed Cores" (I.I.E. Paper), by P. Dunsheath; "Nickel Iron Alloys for Current Transformers," by W. Phillips; Automatic Substations.

THE EXPORT WORLD.—Survey of British Industrial Conditions; Latest at Home; December Exports; European Trade.

THE FRUIT GROWER.—Bitter Pit in Apples; Latest Researches; For the Beginner; Spraying Practice; Association Affairs.

GARDENING ILLUSTRATED.—Expeditions in Seedland; Special Novelty Number; "Apple Problems," by the Editor; "Does Fruit Growing Pay"? by E. A. Bunyard.

THE GAS WORLD.—The Laws of Gas Flow; The 1926 Accounts of the Gas Light and Coke Co.; Methods of Measuring Gas.

THE HARDWARE TRADE JOURNAL.—The Paint and Varnish Section of the Hardware Trade; Past and Present Methods of Brassfounding; The Manufacturing of Mats and Matting.

THE TIMBER TRADES JOURNAL.—Benevolence in the Timber Trade; Scottish Protest Against Railway Rates for Pitprops; Woodworkers' Parliament.